THE AMERICAN
JOURNAL OF PHARMACY

MARCH, 1912

THE HEART TONIC UNIT.

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It is a fact universally recognized by those concerned in the manufacture and standardization of drug extracts, that the crude drugs from which they are obtained vary widely in their content of active constituents. This variation can be adjusted readily when the active constituent is of such a nature as to be assayed by chemical process. This, however, with our present knowledge, is impossible to apply to a number of the very important drugs. It is particularly true of the Digitalis series of Heart Tonics.

In 1898, Dr. Houghton (*Journal of the American Medical Association*) called attention to a method by which this important series of drugs could be standardized with considerable accuracy. It involved the use of frogs, and depends upon the toxicity of the drug to these animals. That method greatly amplified and improved, was proposed at the Seventh International Congress of Applied Chemistry at London (*Lancet*, June 18, 1909) as a method which could be readily applied for the standardization of the cardiac tonics, by which that uniformity could be obtained in the activity of these preparations so essential to their therapeutic application.

Pharmacologists have very generally agreed that the cold-blooded animals and especially frogs are much better adapted to the standardization of the cardiac tonics than the warm-blooded animals, because the latter die from paralysis of respiration, while in the frog respiration through the skin will compensate for this paralysis and the cause of death is due entirely to the action of these drugs directly on the heart. This agreement, as to the animal to be used, does not, however, extend to the method. There are three methods in use by different pharmacologists, that used in Europe being one

suggested by Focke, of Dusseldorf (*Archiv. der Pharmazie,* Band 248, Heft 5, p. 5345). By this method, which is a modification of that of Houghton, a value V is obtained by taking into account not only the weight and dose, but also the time necessary to kill the frog. The method is not difficult to follow, but the results obtained seem not to have the accuracy of those obtained by the original method, as demonstrated by Houghton. The words of Focke, the author of this modification, probably describe it with fair accuracy as follows: "From the collected evidence it may be seen that the Short Time Method of physiological Digitalis and Strophanthus testing is indeed not free from difficulties and, therefore, requires care as well as practice, that it, however, satisfied pharmacological demands and all practical requirements in an advantageous manner, besides being easily understood and not inhuman."

American investigators have, however, more generally adopted, either the method of Houghton or a modification of it, suggested by Cushny. The latter determines the dose necessary to stop the laid bare frog's heart in systole in exactly one hour. It is described by Edmunds, Bulletin No. 48, P. H. & M. H. Laboratory.

The original method of Houghton slightly modified and later presented at the Los Angeles meeting of the American Pharmaceutical Association (Houghton & Hamilton, AMERICAN JOURNAL OF PHARMACY, October, 1909), included also a means by which the activity could be indicated on the label. This constituted a distinct advance over any method previously used for indicating the value of such drugs. It is in short, the adoption of a Heart Tonic Unit and the statement that the unit quantity—1 c.c. or 1 gram—of the substance contains a certain number of H.T.U.'s.

The Heart Tonic Unit is derived from the Minimum Lethal Dose, a factor which is obtained by determining the toxicity to frogs of any member of the digitalis series of heart tonics.

The method of Houghton, described in detail in the AMERICAN JOURNAL OF PHARMACY, referred to above, specifies certain conditions as being essential to its successful application. It consists in brief in the determination of the M.L.D. by injecting several series of frogs with varying quantities of the solution properly diluted, using a sufficient number of frogs to obtain the smallest dose which is fatal to a majority of the frogs used. On account of the variation in the resistance of frogs at different seasons of the year, and under different conditions of temperature and atmospheric changes,

a standard product is also to be tested on a series of frogs run parallel to those under test for the sample. Twelve hours or more are allowed to elapse before the results are read from each series of tests. When a sufficient number of series of tests have been made, to determine with accuracy the toxicity of both sample and standard to these frogs, the activity of the sample in question can be stated in terms of the standard. If the sample being standardized has the same M.L.D. as that of the standard, its activity is 100 per cent.; if its M.L.D. is greater or less than that of standard its activity is the inverse ratio of the M.L.D.'s of sample and of standard. For example, if the M.L.D. of a Tincture of Strophanthus is .00010, while that of the standard tincture is .00015, its activity compared to standard is the ratio of .00015 to .00010, or 1½, and its percentage of activity is 150. A more convenient way is that where its activity is expressed in Heart Tonic Units.

A Heart Tonic Unit is ten times the minimum lethal dose of the standard for each of the members of the digitalis series determined as above, when the frogs are of normal resistance. The number of H.T.U. per cubic centimetre in the sample so tested is the reciprocal of one Heart Tonic Unit.

Table I gives the M.L.D. and H.T.U. per cubic centimetre for each of the official preparations of the digitalis series of heart tonics when of standard activity.

TABLE I.

	M. L. D.	Exact No. of H. T. U. per c.c.	No. of H. T. U. in round numbers per c.c.
Digitalis—Fluid Extract, U.S.P., 1890	.0015	66	65
Solid Extract	.0005	200	200
Tincture, U.S.P., 1900	.015	6	6
Digitalin (Germanic)	.00005	2000	2000
Squill—Fluid Extract, U.S.P., 1890	.0012	83	80
Strophanthus—Tincture, U.S.P., 1900	.000075	1300	1300
Convallaria—Fluid Extract:			
Rhizome and roots, U.S.P.	.00025	400	400
Herb	.00015	666	650
Flowers	.00009	1111	1100

On account of the variation in the toxicity of the standard and of the different preparations belonging to this series, due to changes in the resistance of frogs, as noted above, it becomes a matter of considerable importance, as well as convenience to have a table to which one can refer and readily deduce the number of H.T.U.

of any preparation after obtaining its M.L.D. The number of H.T.U. in any given preparation is the reciprocal of 10 times the M.L.D. if the frogs are of normal resistance. The resistance of frogs, however, varies greatly, and for this reason the number of H.T.U. per cubic centimetre can evidently not be obtained in so simple a manner.

The factor to be used for adjusting its value is the ratio between the M.L.D. of the standard selected and its average M.L.D. The formula would, therefore, be

$$\frac{1}{10 \times \text{M.L.D. of Sample}} \times \frac{\text{M.L.D. of Standard}}{\text{Average M.L.D. of Standard}}$$

= H.T.U per c.c. or gm. By means of this formula the correctness of any number in the table may readily be verified.

In Table II the numbers in the first horizontal column are the M.L.D. of standard Tincture Strophanthus, U.S.P., 1890, the range of doses being such as to cover the variation in its toxicity to frogs during the different seasons of the year.

The eight horizontal columns of numbers following this are the M.L.D. for each preparation of the series, with the same range in toxicities as for the Tincture mentioned first.

The numbers in the first vertical column beginning with .010 are M.L.D. of samples. In this column will be found every possible M.L.D. of members of this series by merely adjusting the decimal point.

All the other numbers in columns A to I inclusive and below the double line are H.T.U. per cubic centimetre or per gramme of preparations of the digitalis series of heart tonics, any particular number being the value in terms of Heart Tonic Units of a sample whose M.L.D. is at the head of the horizontal column and the M.L.D. of the standard is in the vertical column which intersects the horizontal at that number.

For example, if a Tincture of Digitalis has a M.L.D. of .020 while that of the standard Tincture Digitalis is .012, it contains 4 H.T.U. per cubic centimetre, this number being found where the columns headed D and .020 intersect.

The number representing the H.T.U. of any preparation having an M.L.D. from .010 to .099 may be found in this way, while those of greater toxicity may be obtained by using a multiple of the number given. For example, if a sample of F.E. Digitalis has the M.L.D. .0020 while that of the standard F. E. Digitalis is .0012, the

sample contains 40 H.T.U. since its toxicity is ten times that used in the first illustration.

It is evident therefore, that with the data obtained from the assay on frogs one may find in the table the Heart Tonic Units accurately determined for any degree of toxicity.

In a laboratory where samples of every preparation of this series may come in for assay at one time it is inconvenient and, as one can readily see, unnecessary to have an assay of the corresponding standard for each one, since the only object of testing the standard in comparison with the sample is to determine the resistance of the frogs. For this purpose therefore in an emergency any one of the preparations might be used as the standard, because a change in the resistance of the frogs would bring about a proportionate change in the M.L.D. of all the standards. Whatever standard is adopted, however, should be a product least subject to changes in its activity from any cause. Pure crystalline Kombé Strophanthin is the one which seems to meet all the requirements. This product was finally selected and reported at a meeting of the Philadelphia Section of the American Pharmaceutical Association in March, 1911 (Houghton, *American Druggist*, July 24, Sept. 11th).

The ninth horizontal column of numbers representing M.L.D. of standard preparations of the digitalis series of heart tonics are those for Kombé Strophanthin. These are enclosed between heavy lines. Kombé Strophanthin contains 100,000 H.T.U. per gram, therefore, when this substance is used as the standard the number of H.T.U. in any sample being tested can be calculated by a simpler formula which is obtained by substituting constants in the one previously given and is merely a rearrangement of it. The formula then becomes $\frac{100{,}000 \times \text{M.L.D. Strophanthin}}{\text{M.L.D of Sample}} = \text{H T.U. per c.c. or gm.}$ which can be used at any time in place of the table. The numbers in the table, however, are accurately calculated, and when available are much more convenient than to make the computation in each case.

Table II.

	A	B	C	D	E	F	G	H	I
Tr. Strophanthus, U. S. P. 1890.	.00009	.0001	.00011	.00012	.00013	.00014	**.00015**	.00016	.00017
Tr. Strophanthus, U. S. P. 1900.	.000045	.00005	.000055	.000060	.000065	.00007	**.000075**	.000080	.000085
F. E. Digitalis (70% alcohol)	.0009	.0010	.0011	.0012	.0013	.0014	**.0015**	.0016	.0017
S. E. Digitalis.....	.00030	.00033	.00037	.0004	.00043	.00047	**.0005**	.00053	.00057
Tr. Digitalis.....	.009	.010	.011	.012	.013	.014	**.015**	.016	.017
Digitalin.....	.00003	.000033	.000037	.00004	.000043	.000047	**.00005**	.000053	.000057
F. E. Squill, U. S. P. 1890.	.00072	.0008	.00088	.00096	.00104	.00112	**.0012**	.00128	.00136
F. E. Convallaria, U. S. P.	.00015	.00017	.00018	.00020	.00022	.00023	**.00025**	.00027	.00028
Strophanthin. .	.0000-006	.0000-0066	.0000-0073	.0000-008	.0000-0086	.0000-0093	**.0000-01**	.0000-0106	.0000-0113

M. L. D. of Samples.	A	B	C	D	E	F	G	H	I
.010	6.000	6.667	7.333	8.	8.667	9.333	10.	10.667	11.333
.011	5.454	6.061	6.667	7.273	7.879	8.485	9.091	9.697	10.303
.012	5.000	5.555	6.111	6.667	7.222	7.778	8.333	8.889	9.444
.013	4.615	5.128	5.641	6.154	6.667	7.179	7.692	8.205	8.718
.014	4.286	4.762	5.238	5.714	6.190	6.667	7.143	7.619	8.095
.015	4.000	4.444	4.889	5.333	5.778	6.222	6.667	7.111	7.556
.016	3.750	4.166	4.583	5.000	5.417	5.833	6.250	6.667	7.083
.017	3.529	3.921	4.314	4.706	5.008	5.490	5.882	6.275	6.667
.018	3.333	3.704	4.074	4.444	4.814	5.184	5.555	5.926	6.296
.019	3.158	3.508	3.860	4.211	4.561	4.912	5.263	5.614	5.965
.020	3.	3.333	3.667	4.000	4.333	4.667	5.	5.333	5.667
.021	2.857	3.175	3.492	3.810	4.127	4.444	4.762	5.079	5.397
.022	2.727	3.030	3.333	3.636	3.939	4.242	4.545	4.848	5.151
.023	2.609	2.899	3.188	3.478	3.768	4.058	4.348	4.638	4.927
.024	2.500	2.778	3.056	3.333	3.611	3.889	4.167	4.444	4.722
.025	2.400	2.667	2.933	3.200	3.467	3.733	4.	4.267	4.533
.026	2.307	2.564	2.820	3.077	3.333	3.589	3.846	4.102	4.359
.027	2.222	2.469	2.716	2.963	3.210	3.457	3.703	3.951	4.197
.028	2.143	2.381	2.619	2.857	3.095	3.333	3.572	3.810	4.047
.029	2.069	2.300	2.529	2.759	2.988	3.218	3.448	3.678	3.908
.030	2.000	2.222	2.444	2.667	2.889	3.111	3.333	3.555	3.778
.031	1.935	2.151	2.366	2.581	2.796	3.011	3.226	3.441	3.656
.032	1.875	2.083	2.292	2.500	2.709	2.917	3.125	3.333	3.541
.033	1.818	2.020	2.222	2.424	2.626	2.828	3.030	3.232	3.434
.034	1.765	1.960	2.157	2.353	2.549	2.745	2.941	3.137	3.333
.035	1.714	1.905	2.095	2.286	2.476	2.667	2.857	3.048	3.238
.036	1.667	1.852	2.037	2.222	2.407	2.592	2.778	2.963	3.148
.037	1.621	1.802	1.982	2.162	2.342	2.523	2.703	2.883	3.063
.038	1.579	1.754	1.930	2.105	2.281	2.456	2.632	2.807	2.982
.039	1.538	1.710	1.880	2.051	2.222	2.393	2.564	2.735	2.906
.040	1.500	1.667	1.833	2.000	2.167	2.333	2.500	2.667	2.833
.041	1.463	1.626	1.789	1.951	2.114	2.276	2.439	2.602	2.764
.042	1.429	1.587	1.746	1.905	2.064	2.222	2.381	2.540	2.698
.043	1.396	1.550	1.705	1.860	2.016	2.170	2.326	2.481	2.636
.044	1.363	1.515	1.667	1.818	1.969	2.121	2.272	2.424	2.575
.045	1.333	1.481	1.630	1.778	1.926	2.074	2.222	2.370	2.518

TABLE II—*Continued.*

M. L. D. of Samples.	A	B	C	D	E	F	G	H	I
.046	1.304	1.449	1.594	1.739	1.884	2.029	2.174	2.319	2.463
.047	1.277	1.418	1.560	1.702	1.844	1.986	2.128	2.270	2.411
.048	1.250	1.390	1.528	1.667	1.806	1.944	2.083	2.222	2.361
.049	1.224	1.360	1.497	1.633	1.768	1.905	2.041	2.177	2.313
.050	1.200	1.333	1.467	1.600	1.733	1.867	2.000	2.133	2.266
.051	1.176	1.307	1.438	1.569	1.699	1.830	1.961	2.091	2.222
.052	1.153	1.282	1.410	1.538	1.667	1.795	1.923	2.051	2.179
.053	1.132	1.258	1.384	1.510	1.635	1.761	1.887	2.013	2.138
.054	1.111	1.234	1.358	1.481	1.605	1.728	1.851	1.975	2.098
.055	1.091	1.212	1.333	1.455	1.576	1.697	1.818	1.939	2.060
.056	1.071	1.191	1.310	1.429	1.548	1.667	1.786	1.905	2.024
.057	1.053	1.170	1.287	1.404	1.520	1.637	1.754	1.871	1.988
.058	1.034	1.150	1.264	1.379	1.494	1.609	1.724	1.839	1.954
.059	1.017	1.130	1.243	1.356	1.469	1.582	1.695	1.808	1.921
.060	1.	1.111	1.222	1.333	1.444	1.555	1.667	1.778	1.889
.061	.984	1.093	1.202	1.311	1.421	1.530	1.639	1.749	1.858
.062	.968	1.075	1.183	1.290	1.398	1.505	1.613	1.720	1.828
.063	.952	1.058	1.164	1.270	1.376	1.481	1.587	1.693	1.799
.064	.938	1.042	1.146	1.250	1.354	1.458	1.562	1.667	1.771
.065	.923	1.026	1.128	1.231	1.333	1.436	1.538	1.641	1.744
.066	.909	1.010	1.111	1.212	1.313	1.414	1.515	1.616	1.717
.067	.896	.995	1.095	1.194	1.294	1.393	1.492	1.592	1.691
.068	.882	.980	1.078	1.176	1.274	1.372	1.470	1.568	1.667
.069	.869	.966	1.063	1.159	1.256	1.352	1.449	1.546	1.642
.070	.857	.952	1.048	1.143	1.238	1.333	1.428	1.524	1.619
.071	.845	.939	1.033	1.127	1.221	1.315	1.408	1.502	1.596
.072	.833	.926	1.018	1.111	1.203	1.296	1.388	1.481	1.574
.073	.822	.913	1.005	1.096	1.187	1.278	1.370	1.461	1.552
.074	.810	.901	.991	1.081	1.171	1.261	1.351	1.441	1.531
.075	.800	.889	.978	1.067	1.156	1.244	1.333	1.422	1.511
.076	.789	.877	.965	1.053	1.140	1.228	1.316	1.403	1.491
.077	.779	.866	.952	1.039	1.125	1.212	1.300	1.385	1.472
.078	.770	.855	.940	1.026	1.111	1.196	1.282	1.368	1.453
.079	.759	.844	.928	1.013	1.097	1.181	1.266	1.350	1.435
.080	.750	.833	.917	1.000	1.083	1.167	1.250	1.333	1.417
.081	.741	.823	.905	.988	1.070	1.152	1.235	1.317	1.399
.082	.732	.813	.894	.976	1.057	1.138	1.220	1.301	1.382
.083	.723	.803	.884	.964	1.044	1.124	1.205	1.285	1.365
.084	.714	.793	.873	.952	1.032	1.111	1.190	1.270	1.349
.085	.706	.784	.863	.941	1.020	1.098	1.176	1.255	1.333
.086	.698	.775	.853	.930	1.008	1.085	1.163	1.240	1.318
.087	.690	.766	.843	.920	.996	1.073	1.149	1.226	1.303
.088	.682	.757	.833	.909	.985	1.060	1.136	1.212	1.288
.089	.674	.749	.824	.900	.974	1.049	1.124	1.198	1.273
.090	.667	.741	.815	.889	.963	1.037	1.111	1.185	1.259
.091	.659	.733	.806	.879	.952	1.026	1.099	1.172	1.245
.092	.652	.725	.797	.870	.942	1.015	1.087	1.160	1.232
.093	.645	.717	789	.860	.931	1.004	1.075	1.147	1.219
.094	.638	.709	.780	.851	.922	.993	1.064	1.135	1.206
.095	.632	.702	.772	.842	.912	.982	1.053	1.123	1.193
.096	.625	.694	.764	.833	.903	.972	1.042	1.111	1.180
.097	.619	.687	.756	.825	.893	.962	1.031	1.099	1.168
.098	.612	.680	748	.816	.884	.952	1.020	1.088	1.156
.099	.606	.673	.741	.808	.875	.943	1.010	1.077	1 145

THE NAMING OF CARBON COMPOUNDS.

A Dictionary of the Prefixes, Suffixes and other Syllables as well as Letters and Signs Used in the Naming of Carbon Compounds.

By

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PREFACE.

The difficulties in the way of devising a rational and comprehensive system for the naming of carbon compounds and the widely divergent views held by authors and teachers in regard to the system to be adopted, makes it improbable that any one system will come into general use—at least not for a long time to come. Nevertheless, the need and advantage of uniformity and rationalism are so obvious that I have always felt it my duty to do what I could to encourage the correct and uniform naming of chemical compounds. In line with this I published some years ago, in the *Pharmaceutical Review*, a register of the prefixes, endings, etc., used in the naming of carbon compounds, paying particular attention to the system adopted by the Congress held, for this purpose, in Geneva, Switzerland, in 1902.

Inquiries, which have come to me as Secretary of the Council on Pharmacy and Chemistry, regarding the system used for names of organic compounds in New and Non-official Remedies, have made it appear desirable to publish at this time a more extended register for the benefit of teachers, particularly those in schools of medicine and pharmacy who treat of organic compounds, and as a convenient means of reference for physicians and pharmacists in general.

It has been thought desirable to include in this list all syllables, prefixes and suffixes which are in general use in the naming of carbon compounds, but no attempt has been made to make the list complete. The names of parent compounds such as benzene, naphthalene, quinoline, etc., are not considered within the scope of this treatise and have been omitted except in those cases where it was desired to refer to the naming of their derivatives in the

Appendix. In accord with growing preference, the assumed form of combination or linkage, where considered desirable, has been indicated by means of dots, instead of dashes. In general the dots have reference to the combination or linkage of carbon atoms, thus in $CH_3.CH(CH_3).CH:CH_2$ the dots indicate the nature of the linkage of the carbon atoms of the chain.

While the origin of the terms used and also the warrant for their use would be highly interesting, it was not deemed advisable to increase the size of the work by including such references. Further, while the author may have, or probably has, decided preferences, he has not attempted to lay down rules for the adoption of any particular system of nomenclature, but instead has attempted to give definitions for all the terms in common use without preferences.

At this time I wish to express appreciation to my colleagues who were kind enough to examine the first publication and to suggest corrections and additions. Also to those who have consented to examine the proofs of the present publication, particularly my associates, W. S. Hilpert and L. E. Warren.

A

a An abbreviation for *asymmetric* (which see).

a An abbreviation for *ana* (which see).

a Alpha, the first letter of the Greek alphabet (see Appendix H).

a An abbreviation for *anti* (which see).

Ac A prefix derived from *alicyclic* (which see). Also used to indicate the acetyl group, $(CH_3.CO)'$; thus AcH is acetaldehyde, CH_3COH.

açet A prefix showing relation to acetic acid, CH_3COOH, either in structure as in *acetanilide* $C_6H_5NH(CH_3CO)$ or by derivation as in *acetaldehyde* $CH_3.CHO$.

acetin An acetic acid ester of glycerol. *Monacetin* is $C_3H_5(OH)_2(CH_3COO)$, *diacetin* is $C_3H_5(OH)(CH_3COO)_2$ and *triacetin* is $C_3H_5(CH_3COO)_3$.

aceto The same as *acet* (which see).

acetonyl The radical $(CH_3.CO.CH_2)'$ derived from acetone, $CH_3.CO.CH_3$.

acetyl The radical $(CH_3.CO)'$ derived from acetic acid, $CH_3.COOH$.

acid Organic acids in general are compounds containing one or more carboxyl groups (see *carboxyl* and Appendix G). In some

cases the hydroxyl group when associated with certain strongly negative groups imparts acid properties to a compound. Thus trinitrophenol $C_6H_2(NO_2)_3OH$, is a substance having the properties of a strong acid and is known as picric *acid.*

acidamide Synonymous with *amide* (which see).

acridyl Compounds derived from acridine, thus the aldehyde $C_{13}H_9N.CHO$ obtained by the oxidation of methyl-acridine, $C_{13}H_9N.CH_3$, is commonly called *acridyl aldehyde.*

acyl An acyl group is the residue obtained by taking hydroxyl from an organic acid, thus OH taken from acetic acid, $CH_3.COOH$ leaves the acyl group $CH_3.CO'$.

al The ending *al* indicates an aldehyde, that is the group $C\begin{matrix}=O\\ -H\end{matrix}$, usually written—CHO, thus $CH_3.CHO$ is *ethanal,* $CH_3.CH_2.CHO$ is *propanal* (see Appendix G). Exceptions: *methylal* $HCH(OCH_3)_2$ is a compound derived from methyl alcohol (methanol) and *formaldehyde* (*methanal*), $2CH_3OH + HCHO = HCH(OCH_3)_2 + H_2O$. *Acetal,* $CH_3.CH(OC_2H_5)_2$, is derived from ethyl alcohol (ethanol) and *acetaldehyde* (*ethanal*) $2C_2H_5OH + CH_3.CHO = CH_3.CH(OC_2H_5)_2 + H_2O$.

alcoholate Just as, for instance, aldehydes combine with water to form hydrates, thus $CCl_3CHO + H_2O = CCl_3.CH(OH)_2$, so aldehydes combine with alcohols to form alcoholates, thus chloral and ordinary alcohol react: $CCl_3.CHO + C_2H_5OH = CCl_3.CH(OH)(OC_2H_5)$. The term alcoholate is also applied to compounds when hydrogen of the hydroxyl of an alcohol is replaced by metallic elements, thus CH_3ONa, C_2H_5ONa, etc.

ali A prefix indicating *aliphatic* (which see).

alicyclic A *cyclic* (which see) compound belonging to the *aliphatic* (which see) series of hydrocarbons.

aliphatic The name aliphatic is derived from a Greek work meaning *oil* and is often applied to the "Open chain hydrocarbons" because the fats and many of their derivatives belong to this group.

alkyl A term applied to univalent hydrocarbon radicals, especially of the aliphatic series, thus: $(CH_3)'$, $(C_2H_5)'$. These radicals may be considered as derived from the corresponding alcohols: CH_3OH, C_2H_5OH, etc., whence the term *alkyl.*

allyl The group $CH_2:CH.CH_2—$; thus propenol, $CH_2:CH.CH_2OH$, is commonly called *allyl* alcohol.

alphyl Univalent aliphatic hydrocarbon radicals: CH_3—, C_2H_5—, etc. The same as *alkyl* (which see).

amenyl Compounds derived from pentenes (amylenes C_5H_{10}) thus pentenyl benzene $C_6H_5(C_5H_9)$ is termed *amenyl-benzene.*

amid The same as *amide* (which see).

amide The term amide is generally used to indicate compounds obtained by replacing the hydroxyl of an acid by NH_2, thus acetic or ethanoic acid, $CH_3.COOH$, gives ethanamide, $CH_3CO(NH_2)$. Originally the term was applied to all compounds containing the amidogen group, NH_2—, and $CH_3(NH_2)$, now called *methylamine* (see *amine*) is still often called *amido-methane* or *methyl-amide.* Similarly $C_6H_5NH_2$, aniline or phenamine, is often called *amido-benzene.*

amidine Amides in which the oxygen has been replaced by an *imide* (which see) group, thus ethanamide, $CH_3.C\langle{}^{O}_{NH_2}$ yields *ethane amidine*, $CH_3.C\langle{}^{NH.}_{NH_2}$

amido The group NH_2—. Ethanamide is often called *amido-ethane.*

amin The same as *amine* (which see).

amine Basic compounds formed from alcohols or phenols by replacing OH with NH_2, thus C_2H_5OH yields $C_2H_5NH_2$, *ethane-amine* or *ethyl-amine.*

amino The group NH_2 when it replaces OH of an alcohol, thus ethane-amine is also called *amino-ethane.*

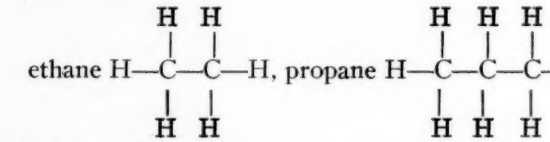
amphi A prefix proposed to be used to indicate a symmetric distribution of the side-chains of a cyclic compound or of the atoms of a hetero-cyclic compound. For 1,3— meta- or mi-diazine it is proposed to substitute the term *amphidiazine* (see Appendix J–e).

amyl Indicates a hydrocarbon chain of five carbon atoms, thus $C_5H_{11}OH$ is amyl alcohol and C_5H_{10} is amylene.

ana A prefix used in indicating position in quinoline derivatives (see Appendix I) and in naphthalene derivatives (see Appendix J).

ane This ending denotes a saturated hydrocarbon, *i.e.*, a compound

in which the carbon atoms are united by single bonds or valencies thus:



ethane, propane (Appendix A).

anhydride See *anhydro.*

anhydro A prefix used to designate anhydrides or compounds from which water has been abstracted.

anilid Same as *anilide* (which see).

anilide Anilides are derivatives of aniline (benzene-amine, benzamine or phenamine, $C_6H_5NH_2$) in which a hydrogen atom of the NH_2 group has been replaced by an *acyl* (which see) group, thus $C_6H_5NH(CH_3.CO)$ is *acetanilide.*

anisyl A prefix used to indicate derivation from anisol (phenyl methyl ether) $C_6H_5.O.CH_3$. Thus *anisyl oxybutyric acid* is $CH_3O.C_6H_4.CH(OH).CH_2.CH_2.COOH$.

anthra In some chemical terms the prefix refers to derivation from coal as in anthracene. In many terms the prefix denotes derivation from anthracene, thus *anthraquinone* and *anthra-flavic acid.*

anthranil A prefix applied to derivatives of *anthranilic acid* (ortho-aminobenzoic acid $C_6H_4(NH_2)COOH$, 1 : 2), thus *anthranil* is an anhydride of *anthranilic acid* and *anthranil-phenylacetic acid* has the composition $C_6H_3.COOH.NH.CH.(C_6H_5)COOH$.

anti A prefix referring to stereoisomerism, thus the two isomeric benzaldoximes are designated *syn-benzaldoxime,* to indicate that the aldehydic hydrogen is near to the hydroxyl, while in *anti-benzaldoxime* they are farther apart from each other. It has been proposed for general use as a means of indicating the symmetrical distribution of side-chains or of the arrangement of the atoms of a heterocyclic ring. For 1, 4-, para- or pidiazine it is proposed to substitute the term *antidiazine.*

apo A prefix used to show derivation, thus *apomorphine* is derived from morphine.

ar An abbreviation for aromatic. One of the names given to the class of organic compounds which are also known as the closed-chains or benzene series of compounds (compare *aliphatic*).

aralkyl A name, meaning aromatic *alkyl,* applied to monovalent

aromatic radicals containing the free valencies in the side-chain, thus benzyl, $C_6H_5CH_2$—.

arsanilate A salt or compound of arsanilic acid. $AsO(C_6H_4NH_2)(OH)_2$, *i.e.*, arsenic acid $AsO(OH)_3$ in which one hydroxyl is replaced by aniline from which one atom of hydrogen has been removed.

arsin An arsin or *arsine* is a compound derived from hydrogen arsenid (arsin, arsine), AsH_3, by replacement of hydrogen with organic radicals. Thus *trimethyl-arsin* or *trimethyl-arsine* is $(CH_3)_3As$ and *methyl-arsin dichloride* is $(CH_3)AsCl_2$. See also *arsinic.*

arsine See *arsin.*

arsinic Derived from, or related to, arsenic acid. Arsinic acids are derived from arsenic acid, $AsO(OH)_3$, by replacement of one or more hydroxyl groups of hydrocarbon radicals, thus *methyl-arsinic acid* is $AsO(CH_3)(OH)_2$ and *diphenyl-arsinic acid* is $AsO(C_6H_5)_2(OH)$. It has also been proposed to restrict the term *arsinic acid* to arsenic acid in which two hydroxyl groups are replaced by hydrocarbon groups.

arson The same as *arsonic* (which see).

arsonate A salt or compound of an *arsonic acid,* thus atoxyl. $C_6H_4(NH_2)(AsO.OH.ONa)$, has been called *sodium anilin-arsonate.*

arsonic Derived from, or related to arsonic acid. Arsonic acids are arsenic acids in which hydroxyl is replaced by a hydrocarbon group, thus *anilin-arsonic acid* is $AsO(C_6H_4NH_2)(OH)_2$.

aryl A name applied to monovalent aromatic groups in which the free valence is in the benzene nucleus.

as An abbreviation for *asymmetric* (which see).

ase An ending used to indicate enzymes or ferments, thus *amylo-glycase* is an enzyme which acts on starch with formation of glucose.

asym An abbreviation of *asymmetric* which means that groups or side-chains are arranged unsymmetrically, thus 1-, 3-, 4-trichlor-benzene is also designated *asymtrichlorbenzene* (see Appendix B–c).

atomic Refer to *monatomic, diatomic, triatomic.*

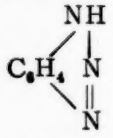
az An abbreviation of azote, meaning nitrogen. Refer to *azo, azoxy,* etc.

azid The group $\left(-N\begin{matrix}N\\ \|\\ N\end{matrix}\right)'$. Thus benzazid is $C_6H_5CO.N\begin{matrix}N\\ \|\\ N\end{matrix}$.

azido The same as *azid* (which see).

azimido The same as *azimino* (which see).

azimino Azo-amino compounds containing three atoms of nitrogen and produced by the action, for instance, of nitrous acid on o-diamines. The composition of *azimino-benzene* is stated to be



azin See *azine.*

azine A name proposed to indicate the "ring" consisting of five carbon atoms and one nitrogen atom, the union being formed by nine "bonds." In a generic sense it has also been proposed for six-atomic "rings" of carbon and nitrogen atoms, united by nine "bonds" (see *diazine, triazine, tetrazine*).

azo The group —N = N—, thus *azobenzene* is $C_6H_5N = NC_6H_5$.

azoin An *azine* (which see) in which one atom of carbon has been replaced by an oxygen atom. The ring consists, therefore, of one oxygen atom, one nitrogen atom and four carbon atoms, the "ring" being formed by nine "bonds."

azol The same as *azole* (which see) which is to be preferred.

azole A name proposed for "rings" of carbon and nitrogen atoms, consisting of five atoms, the "ring" being formed by seven "bonds." Specifically, the ring consisting of one nitrogen and four carbon atoms is termed *azole,* that containing two nitrogen and three carbon atoms *diazole,* etc.

azoxol A name proposed for a ring consisting of one nitrogen atom, one oxygen atom and three carbon atoms.

azoxy The group $-N(O)-N-$, thus *azoxybenzene* is $C_6H_5-N(O)-N-C_6H_5$.

azthin An *azine* (which see) in which one carbon atom has been replaced by a sulphur atom, thus the ring consists of one sulphur atom, one nitrogen atom and four carbon atoms.

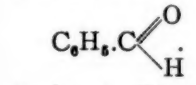
B

β Beta, the second letter of the Greek alphabet (see Appendix H).

basic Compounds that possess the properties of metallic hydroxides or bases, forming salts with acids, etc., are said to be *basic.* On the other hand, an acid is said to be *monobasic* if it possesses one acid hydrogen atom or ion, which is replaceable by a metal, *dibasic* if it possesses two such acid hydrogen ions, *tribasic* if three, etc.

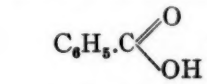
benz A prefix usually indicating derivation from benzoic acid (see *benzal, benzoyl, benzyl*). It is sometimes used to denote derivation from *benzene* (see Bz).

benzal The divalent radical $(C_6H_5CH)''$ derived from *benzaldehyde,*



benzenyl The trivalent radical $(C_6H_5.C)'''$ derived from benzoic acid $C_6H_5.COOH$. Thus $C_6H_5.C(OH)_3$ is called *benzenyl alcohol* and $C_6H_5C(N.OH).NH_2$ is called *benzenylamidoxim.*

benzo The trivalent radical $(C_6H_5.C)'''$ derived from benzoic acid,



thus $C_6H_5CCl_3$ is called *benzo-trichloridi.* Often the term is used to indicate in a general way derivation from benzoic acid.

benzol In the past *benzol* has been used at times for *benzene.*

benzo-oxy The univalent radical $(C_6H_5COO)'$. It may be considered as benzoic acid which has lost its acidic hydrogen or as formed by replacing the H of a hydroxyl group by a *benzoyl* group, *i.e.,* a benzoyl-oxy group usually contracted to *benzoxy* group (which see).

benzoxy The radical $(C_6H_5COO)'$. Thus the substance beta-eucaine is called *trimethylbenzoxy-piperidin.* The same as *benzo-oxy* (which see).

benzoyl The univalent radical $(C_6H_5CO)'$ derived from benzoic acid, C_6H_5COOH.

benzyl The monovalent group $(C_6H_5CH_2)'$—.

bi A prefix denoting that a compound contains two equivalents of the substances named: as *bichloride, bicyanide,* etc. More generally to indicate salts which have been formed in such a way that but one-half of the acidic hydrogen of the acid is replaced

by the base, thus sodium acid tartrate, $NaH(C_4H_4O_6)$ is commonly called sodium *bitartrate.*

bornyl The monovalent radical $(C_{10}H_{17})'$ derived from borneol $C_{10}H_{17}OH$. Thus *bornyl isovalerate* is $CH_3.CH(CH_3)CH_2.COO(C_{10}H_{17})$.

brom The presence of bromine in organic compounds is generally indicated by the prefix *brom,* thus *brom-ethan* is C_2H_5Br and *tribrom-methan* is $CHBr_3$.

bromhydrin A name used to indicate compounds derived from di-atomic or poly-atomic alcohols or in a narrow sense from glycerol in which a part of the hydroxyl has been replaced by bromine, thus 3-brom-propan-1, 2-diol, $CH_2BrCHOH.CH_2OH$, is also called *bromhydrin* (∝-monobromhydrin) (see also *chlorhydrin*).

bromo The same as *brom* (which see), the connective *o* being used for the sake of euphony in *bromoethan,* etc.

Bu In writing chemical formulas it has been proposed to indicate the butyl group $(C_4H_9)'$ by *Bu,* thus BuOH is *butyl alcohol,* $CH_3.CH_2.CH_2.CH_2.OH$.

but A prefix derived from butyric acid, indicating compounds containing four carbon atoms, thus *butane* is C_4H_{10}, *butene* is C_4H_8, *butine* is C_4H_6.

butenyl The monovalent radical $(C_4H_7)'$. Thus $C_6H_5.CH:CH.CH_2.CH_3$ is *1-butenylbenzene.*

butyl The radical $(C_{10}H_9)'$ considered as derived from butyl alcohol $C_4H_9.OH$ by the elimination of hydroxyl or from butane C_4H_{10} by the elimination of hydrogen. Thus $CH_3.CHCl.CCl.CH(OH)_3$ is commonly called *butylchloralhydrate.*

butyryl A prefix denoting derivation from butyric acid C_3H_7COOH. Thus *butyryl chloride* is C_3H_7COCl.

Bz An abbreviation denoting benzene. For its use in nomenclature of *quinoline* derivatives see Appendix I. In the writing of chemical formulas it has been proposed to indicate the benzoyl group, $(C_6H_5.CO)'$ by Bz, thus BzCl is *benzoyl chloride* (C_6H_5COCl).

C

χ Chi, the twenty-second letter of the Greek alphabet (see Appendix H).

cacodyl The monovalent radical $((CH_3)_2As)'$. Thus *cacodyl chloride* is $(CH_3)_2AsCl$.

cacodylate. Derivatives of dimethylarsenic acid or cacodylic acid $(CH_3)_2AsOOH$. Thus *sodium cacodylate* is $(CH_3)_2AsOONa$.

carbamate A derivative, salt or ester, of carbamic acid $CO(NH_2)$-OH; thus $CO(NH_2)(OC_2H_5)$ is *ethyl carbamate* (urethane).

carbamide The amide $CO(NH_2)_2$ of carbonic acid, also called urea.

carbinol A synonym for methanol or methyl alcohol (see also Appendix D–c).

carbocyclic Applied to *cyclic* (which see) compound in which the ring consists of carbon atoms (compare *heterocyclic*).

carbonic acid As a suffix it is used to indicate compounds derived from *carbonic acid,* H_2CO_3, thus *ethyl-carbonic acid,* (C_2H_5)-HCO_3. Incorrectly it has been used as synonymous with the German *karbonsäure* and thus phenyl-chinolin karbonsäure has been translated into phenyl-quinoline carbonic acid instead of phenyl-quinoline-carboxylic acid.

carbonyl The group $(=C=O)''$ found in aldehydes, acids and ketones, thus $CH_3.C\langle{}^{O}_{H}$, $CH_3.(C=O)\ CH_3$.

carboxyl The group $\left(-C\langle{}^{O}_{OH}\right)'$, *i .e., carbonyl hydroxyl.* It is usually written COOH or CO_2H. Organic acids owe their acid function to this group (see Appendix G).

carboxylic acid A suffix indicating a carboxyl group, thus quinoline carboxylic acid is a compound in which one hydrogen atom of quinoline has been replaced by the carboxyl group.

carbylamine The monovalent group $(NC)'$, thus C_6H_5NC is *phenyl-carbylamine. Carbylamines* are also called *isocyanides* and *isonitriles.*

chino See *quino.*

chinolin The same as *chinoline* (which see).

chinoline A name applied to *quinoline,* used particularly in German publications.

chlor The presence of chlorine atoms in carbon compounds is commonly indicated by the prefix *chlor,* thus *chlor-ethane* is CH_3Cl and *trichlor-acetic acid* is $CCl_3.COOH$.

chloral Trichlorethanal, $CCl_3.CHO$ is commonly called *chloral.* Incorrectly the term *chloral* has also been used to designate trichlorethandiol or *hydrated chloral,* $CCl_3C(OH)_2$. The term

chloral has also been at times used in a generic sense to designate related compounds, thus the compound $CH_3.CHCl.CCl_2.CHO$ is commonly called *butyl-chloral.*

chlorhydrate See *hydrochlorate.*

chlorhydrin A name applied to compounds derived from di-atomic or poly-atomic alcohols by partial replacement of the hydroxyl by chlorine, thus 2-chlor-ethan-1-ol, $CH_2Cl.CH_2OH$, is also called *glycol-chlorhydrin.*

chloro The same as *chlor* (which see) the connective *o* being used for the sake of euphony in *chloroethan,* etc.

cinnamoyl The radical $(C_6H_5.H:CH.CO_2)'$ derived from cinnamic acid $C_6H_5.CH:CH.COOH$.

cinnamyl The name commonly given to the radical $(C_6H_5.CH:CH.CH_2)'$ derived from cinnamic alcohol, $C_6H_5.CH:CH.CH_2OH$.

croton A prefix used to indicate derivation or relationship to the *crotonic acids.* The name *croton chloral* was applied to 2, 2, 3-trichlorbutanal or butyl chloral because at the time of discovery this compound was supposed to be *trichlorcrotonic aldehyde.*

crotonic A prefix showing relation to *crotonic acid* C_3H_5COOH. Thus *crotonic aldehyde* is C_3H_5CHO.

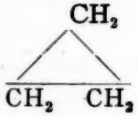
crotonoic The same as *crotonic* (which see).

cyan Containing the group $(CN)'$ a cyanide (see *cyano*).

cyanate The monovalent radical $(.N:C:O)'$, thus *potassium cyanate* is KNCO.

cyanide The monovalent radical $(CN)'$, thus KCN is *potassium cyanide,* and CH_3CN, commonly called ethane-nitrile, is also called *methyl cyanide* (see *cyano*).

cyano Containing the group $(CN)'$, a cyanide.

cyclo A prefix indicating "closed chain" or "ring" compounds; thus *cyclopropane* is  ; *cyclo-hexatriene* is benzene (see Appendix C).

D

d An abbreviation for dextrorotatory (see *dextro*).

δ Delta, the fourth letter of the Greek alphabet (see Appendix H). The letter is also used in the capitalized form Δ, to indicate double bonds (see Appendix H).

dec, deca, dekyl Prefixes derived from *deca,* meaning ten, thus *decane* is $C_{10}H_{22}$, *decene* is $C_{10}H_{20}$, *dekylene* is $C_{20}H_{20}$.

deca See *dec.*

dekyl See *dec.*

dextro An abbreviation for *dextrorotatory, i.e.,* rotating polarized light to the right.

di Prefix indicating two, thus *dichlorethane* is $C_2H_4Cl_2$, ethane diol is $C_2H_4(OH)_2$.

diatomic Alcohols and phenols containing two hydroxyl groups; diols are said to be *diatomic.*

diazine An *azine* containing two nitrogen atoms (see *azine*), *i.e.,* a ring consisting of four carbon atoms and two nitrogen atoms united by nine "bonds." The three isomeric diazines are distinguished by numbering the nitrogen atoms, thus: *1, 2-diazine, 1, 3-diazine* and *1, 4-diazine,* or in the same order as *ortho-diazine, meta-diazine* and *para-diazine* and also as *oiazine, miazine,* and *piazine.*

diazo A prefix indicating the group N:N (di + azo), thus C_6H_5-N:N.Cl is *diazobenzene chlorid.*

din Ending used by Eclectics to indicate oleo-resins, thus *Iridin, Pteledin, Asclepedin.* Ending not in general use.

dodec The same as *dodeca* (which see).

dodeca A prefix indicating twelve, thus $C_{12}H_{20}$ is *dodecane* (dodec and ane).

E

ε Epsilon, the fifth letter of the Greek alphabet (see Appendix H).

η Eta, the seventh letter of the Greek alphabet (see Appendix H).

en See *ene.*

ene The suffix *en* or *ene* generally indicates the unsaturated group C:C, thus $CH_2:CH_2$ is ethene (eth-ene). Exceptions: *terpene, naphthalene, anthracene,* etc.

enol The suffix *enol* (en + ol) indicates an unsaturated alcohol, thus $CH_2:CHOH$ is *ethenol.*

epi See Appendix J–e.

erythr Derived from the Greek, *ἐρυθρός,* meaning *red* and having reference to this color in such compounds as *erythro-dextrin,* a form of dextrin which becomes red on treatment with iodin. It is generally used to designate relation to butane tetrol $CH_2OH.CHOH.CHOH.CH_2OH$, commonly called *erythrol,* or *erythrite,* because of its original preparation from *erythrin,* a naturally occurring compound yielding a red color.

erythro The same as *erythr* (which see).

ester Esters are compounds in which the hydrogen ions of acids, organic or inorganic, have been replaced by organic radicals, thus acetic acid, CH_3COOH, and ethyl alcohol, C_2H_5OH, form $CH_3COO(C_2H_5)$, *acetic-acid-ethyl-ester* or *ethyl acetate.*

Et Used in chemical formulas to represent the ethyl group $(C_2H_5)'$; thus ethyl alcohol, C_2H_5OH, is sometimes written EtOH.

eth A prefix indicating compounds with two carbon atoms, thus C_2H_6 is *ethane,* C_2H_5OH is *ethyl alcohol* or ethanol, etc. Also used to indicate the ethyl group in writing formulas, thus $CH_3.CH_2.CH(C_2H_5).CH_3$ is also written $CH_3.CH_2.CHEth.CH_3$.

ethenyl The monovalent radical $CH_2:CH—$ derived from ethene.

ether Ethers are oxides or monovalent hydrocarbon radicals, thus *ethyl ether* (Ether, U.S.P.) is $C_2H_5O.C_2H_5$. See *oxy.*

ethidine See *ethylidene.*

ethinyl The monovalent radical $(CH:C—)'$ derived from *ethine.*

etho The monovalent group $(CH_3.CH_2—)'$ when it is contained in a side-chain (see Appendix A).

ethoxy The group $(CH_3.CH_2O)$ derived from ethyl alcohol, $CH_3.CH_2OH$.

ethyl The monovalent radical $CH_3.CH_2—$, derived from *ethane.*

ethylal The monovalent radical $(—CH_2.CHO)'$ derived from *ethanal,* $CH_3.CHO$, and still retaining its aldehyde group.

ethylene A synonym for *ethene.* Also applied to bodies containing the group $(—CH_2.CH_2—)''$ being derived from ethene, thus 1, 2-dichlorethane, $CH_2Cl.CH_2Cl$ is also called *ethylene chloride.*

ethylenyl The trivalent radical $(C_2H_3)'''$. See also *ethylidene.*

ethylidene The divalent radical $(CH_3.CH)''$, thus 1, 1-dichlorethane is also called *ethylidene chloride* or *ethidine chloride.* The term has also been used to indicate the radical $CH_3.C'''$; thus chloral, CCl_3CHO, has been called *trichlor-ethidine aldehyde* and *trichlor-ethylidene.*

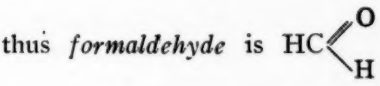
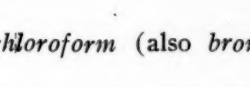
ethylol The monovalent radical $(—CH_2.CH_2OH)'$ derived from *ethanol* and still containing the alcohol group.

F

figures For numerals 1, 2, 3, etc., see Appendix B.

five See Appendix B.

form A prefix denoting derivation from or relation to *formic acid*

(methanoic acid) HCOOH, thus *formaldehyde* is  *formamide* is  . In *chloroform* (also *bromoform* and *iodoform*) the suffix form indicates the radical CH‴ derived from formic acid.

formo The same as *form* (which see).

formyl The group (HCO)″ derived from formic acid HCOOH. The term formyl has also been applied to (HC)‴, assumed to be contained in chloroform, $CHCl_3$ (see *form*).

furfural The divalent radical $(C_5H_4O)''$ derived from furfurol (*furfuraldehyde*) $C_4H_3O.CHO$.

furyl The monovalent radical $(C_4H_3O)'$ derived from furan (furfuran) C_4H_4O. The term furyl is sometimes also applied to furomethyl $C_4H_3O.CH_2'$, thus *furyl acetate* is $C_2H_3O_2.C_5H_5O$.

G

γ Gamma, the third letter of the Greek alphabet (see Appendix H).

glyceryl The triatomic group $(C_3H_5)'''$ derived from glycerol, $C_3H_5(OH)_3$, thus the nitric acid ester of glycerol, $C_3H_5(NO_3)_3$, is often called *glyceryl nitrate.*

glycol (a) A name applied to ethan-1, 2-diol, $CH_2(OH).CH_2(OH)$. (b) The term *glycol* is also used to indicate derivatives of ethan-1, 2-diol, thus ethanolal, $CH_2OH.CHO$, is commonly called *glycolic aldehyde* and ethanolic acid, $CH_2OH.COOH$, is called *glycolic acid.* (c) The term glycol is used in a generic sense to indicate diatomic alcohols, thus trichlorethandiol (hydrated chloral, U.S.P.) has been called *trichlorethidene-glycol.*

glycyl The term has been used to indicate derivatives of glycocol, $CH_2NH_2.COOH$, from which hydroxyl, OH, has been replaced; thus *glycyl-tryptophan* is a compound of tryptophan and glycol having the formula: $(C_{11}H_{11}N_2)CO.CH_2.NH_2$.

Greek alphabet See Appendix H.

H

hemi Derived from the Greek *hemi,* meaning half, the prefix is used to show the relation of simpler bodies to related more complex forms, thus $C_6(COOH)_6$ is called mellitic acid and

$C_6H_3(COOH)_3$ is called *hemimellitic acid.* Hemicellulose is a body similar to but more simple than cellulose.

hept Hept, Hepta, Heptyl, prefixes derived from *hepta,* meaning seven, thus *heptane* is C_7H_{16}, *heptene* is C_7H_{14}, *heptyl-alcohol* (normal) is $CH_3(CH_2)_5.CH_2.OH$.

hepta See *hept.*

heptyl See *hept.*

heterocyclic A cyclic carbon compound containing besides carbon, one or more other elements in the ring.

hex Hex, hexyl, prefixes derived from *hex,* meaning six, thus *hexane* is C_6H_{14}, *hexene* is C_6H_{12}, *hexyl-alcohol* (normal) is $CH_3(CH_2)_4.CH_2.OH$.

hexyl See *hex.*

hom The same as *homo* (which see).

homo The prefixes *hom* and *homo* meaning "the same" are used to show relation of one compound to another. Thus conic acid and *homoconic acid* and atropine and *homatropine.*

hydrate Used to indicate water of hydration (less correctly called water of crystallization); thus, *oxalic acid dihydrate* for $H_2C_2O_4 + 2H_2O$. In the past the term has also been used to indicate hydroxides, thus 2-methyl butan-2-ol, $CH_3.CH_2.C(CH_3)(OH)CH_3$, is commonly called *amylene hydrate* (derived from amylene by hydration), thus $CH_3.CH:C(CH_3).CH_3 + H_2O = CH_3.CH_2.C(CH_3)(OH).CH_3$.

hydrazide A hydrazide is a compound derived from hydrazine, $H_2N.NH_2$ by replacement of hydrogen with acyl groups; thus primary *acetyl-hydrazide* is $CH_3CO.HN.NH_2$ and symmetrical, secondary, *acetyl-hydrazide* is $CH_3CO.HN.NHCH_3CO$.

hydrazine Bodies derived from diamide, $NH_2.NH_2$, thus $C_6H_5.NH.NH_2$ is *phenyl hydrazine.*

hydrazo Indicates the group (—NH.NH—)′. Thus $C_6H_5.NH.NH.C_6H_5$ is *hydrazo-benzene.*

hydrazone A hydrazone is a compound formed by the condensation of a hydrazine with an aldehyde or a ketone, thus phenylhydrazine and acetaldehyde condense to form *acetaldehyd-phenylhydrazone,* thus $C_6H_5NH.NH_2+CH_3CHO=C_6H_5NH.N(CH_3CH:)+H_2O$ and phenylhydrazine and acetone yield *acetone-phenylhydrazone,* thus $C_6H_5NH.NH_2+(CH_3)_2CO=C_6H_5NH.N:C(CH_3)_2+H_2O$.

hydride A hydrogen derivative. Thus ethane may be considered as derived from ethyl alcohol, C_2H_5OH, by replacing the hydroxyl group by hydrogen, $C_2H_5.H$ and hence is sometimes

called *ethyl hydride*. Similarly cyclohexane may be considered as derived from benzene by addition of six hydrogen atoms and then is represented by the formula $C_6H_6.H_6$ and called benzene *hexahydride*.

hydrin See *chlorhydrin* and *bromhydrin*.

hydro The prefix denotes the presence of hydrogen. Thus the compound $C_6H_5.CH_2.CH_2.COOH$ is called *hydrocinnamic acid* because it is produced from cinnamic acid $C_6H_5.CH:CH.COOH$ by reduction; *i.e.*, absorption of hydrogen. It is often used in the naming of hydrides, that is, for compounds in which hydrogen is combined directly, without intervention of oxygen with carbon, thus compounds of hydrogen and carbon are called *hydrocarbons* and the hydrides of benzene (reduced benzenes) are called *dihydrobenzene, tetrahydrobenzene* and *hexahydrobenzene*.

hydrobromate See *hydrobromide*.

hydrobromide The bromides of organic bases, such as aniline, the alkaloids, etc., are commonly called hydrobromides or hydrobromates, in the same way and for the same reason that ammonium bromide was formerly called *ammonia hydrobromide*.

hydrochlorate The same as *hydrochloride* (which see).

hydrochloride The chlorides of organic bases are commonly called hydrochlorides or hydrochlorates. Compare *hydrobromide*.

hydroxy A prefix indicating hydroxyl, thus *hydroxybenzene* is phenol, C_6H_5OH, *ortho-dihydroxybenzene* is 1, 2-phendiol or pyrocatechol, $C_6H_4(OH)_2$.

hydroxyl The monovalent group $(OH)'$, considered as derived from water (hydrogen oxide).

(To be continued.)

A NOTE ON THE PROPOSED FORMULA FOR PETROX.

By John K. Thum, Ph.G.

Pharmacist at the German Hospital, Philadelphia, Pa.

To the writer's mind the adoption of the proposed formula in place of the present one in the National Formulary for Petrolatum Saponatum Liquidum, or "Liquid Petrox" as it is more commonly called, would be an unwise step. The present one is very readily made, never necessitating the use or application of heat, saponification begins at once and in less than a moment's time is complete.

In the proposed formula stronger ammonia water is used instead of the alcoholic spirit of ammonia. This change is, in my opinion,

a mistake. Those who advocate this change use this argument: "Spirit of ammonia is so rarely called for, that it is kept in stock by comparatively few druggists and even when in stock it is usually deteriorated and of uncertain strength." This seems to me a very poor argument, in fact, no argument at all; the same thing could as well be said of stronger ammonia water. Real pharmacists always see to it that the ingredients that enter into the manufacture of their preparations are of the required standard; those who do not must necessarily allow themselves to be taken care of by the manufacturing pharmacists.

The directions for mixing the ingredients in the proposed formula are faulty. In the writer's experience he has been unable to induce saponification by following the directions in the proposed formula. These directions are as follows: "Mix the liquid petrolatum, oleic acid and oil of lavender flowers in a flask, then add the alcohol and finally the stronger ammonia water and agitate thoroughly until clear, warming the mixture slightly, on a water-bath if necessary." The writer followed these directions very closely several times and each time without favorable result. However, by adding the stronger ammonia water to the alcohol and then this mixture to the liquid petrolatum and oleic acid previously mixed together saponification was obtained but the application of heat was essential.

The addition of the oil of lavender flowers before saponification takes place is also subject to criticism. Saponification always generates more or less heat; and for obvious reasons heat should not be brought in contact with desirable odoriferous principles.

"Hold on to those things that are good" should be the aim of the revision committee, and in this case the present National Formulary formula is good. The addition of a small amount of essential oil to it to disguise any disagreeable odor the preparation might have cannot be objected to.

In order to place the matter before the committee of revision of N.F. in a concrete form, the writer advises the retention of the present formula with the addition of an essential oil as follows:

Liquid petrolatum	100 c.c.
Oleic acid	50 c.c.
Spirits ammonia, U.S.P.	25 c.c.
Oil of lavender flowers	3 c.c.

Mix the liquid petrolatum, oleic acid and spirits ammonia; when cool, add the oil of lavender flowers and keep in a dark place.

SUNDAY REST AND SHORTER HOURS OF LABOR FOR PHARMACISTS.

By Edgar Reed Sparks, Ph.G.

Numerous are the splendid articles which have been written and published on this subject, and equally numerous are the excellent addresses which have been delivered in the effort to persuade pharmacists to decrease the number of their hours of labor, especially their hours on Sunday; in fact, the subject has been so thoroughly covered that it seems unnecessary for an obscure druggist to attempt to offer a contribution to the cause.

The writer fully recognizes the difficulty of finding something new to help the cause, and believes that he can probably render no better assistance than to collect and present portions of some of the many helpful contributions which have previously been published, hoping that the repeated message may reach some of those who have not read nor heard the original articles.

The fact that pharmacists realize the importance of this subject seems to have been clearly indicated by the manner in which the matter was received at three important pharmaceutical meetings last year; the first of these was the annual meeting of the "Penna. Pharm. Ass'n," in June, at which Mr. Joseph W. England, of Philadelphia, presented the splendid resolutions urging the pharmacists of the State to adopt a Sunday closing plan; these resolutions were heartily adopted and have since appeared many times in print, doubtless being of great benefit to the cause.

The second event was at the annual meeting of the "American Pharmaceutical Association" in Boston last August, when Dr. Clement B. Lowe, of this city, presented his paper entitled "*Some Every-day Problems.*" We were informed that the largest space in this paper was devoted to the Sunday closing proposition and that after the reading of the paper an interesting discussion took place; Mr. B. E. Pritchard, of Pittsburg, states that "many of the leaders in thought and right action spoke on the subject, *not one in opposition.*"

The third event was at the annual convention of the "National Association of Retail Druggists" at Niagara Falls in September last, when the "Committee on Fraternal Relations" presented their report which dwelt almost entirely upon the "Sunday Rest and

Shorter Hours of Labor" problem; the report was favorably received and the writer was informed that many delegates expressed their hearty approval of the same.

It seems quite appropriate that reference should again be made to that excellent contribution to the cause made by Mr. Robert A. Leet, of California, in his paper entitled "Sunday Closing," presented at the Richmond meeting of the "A.Ph.A." in 1910; this paper has been widely published and deserves careful consideration by every pharmacist interested in the Sunday Rest proposition.

Mr. Leet's paper begins with the assertion that "there are but two possible reasons for keeping a drug store open on Sundays: either the money that can be made by keeping open, or else the desire to serve the community represented." The following facts taken from the paper are worthy of special attention: In the year 1907, when the firm of which Mr. Leet is a member decided to close their stores on Sunday, except from 9.00 A.M. to 2.00 P.M., their business on Sundays was a very substantial portion of their whole business, large enough so that if they lost it without any corresponding gain through the week they would be very seriously crippled; quoting the author's own statement:

> After nearly three years now we believe we are prepared to speak on the question of pecuniary loss, and feel that if there is any at all it is so very slight that the advantages and benefits accruing far more than offset it. Our receipts, of course, were very much reduced on Sundays, but we think that they were sufficiently augmented during the week to offset the reduction. We feel certain that as a result of our better hours we have had a choice in the selection of clerks such as we would never have otherwise had. We know that good men have been influenced to place their applications with us by reason of our Sunday closing, and we feel that the moral of our working force is on a higher plane. We feel that on these accounts alone we are more than repaid for the stand that we have taken; and be it understood, we are absolutely independent in this movement, having closed our stores regardless of the fact that our competitors all around us keep open. So much in answer to the question of pecuniary loss.
>
> I think that the druggist who can satisfy himself that he is justified in adopting Sunday closing from the dollar-and-cent point of view can readily find a way to see that his clientage suffers no great inconvenience by reason of his action.
>
> Now there are some few important details to be considered once Sunday closing is decided upon. In the first place, it is very important that you should not take any action which would appear arbitrary to your customers. You will find them practically unanimously in favor of any movement for the betterment of hours if it is presented to them properly, and

yet the same people will freely criticise you as being independent and indifferent to their urgent needs if you do not take them into consultation regarding any shortening of hours to your service to them. In our own case we first of all sent out a personal communication to each physician, telling him it was our intention to close if our plan was agreeable alike to the physician and the community at large, but emphasized the fact that regardless of our desire to better our conditions and that of those in our employ, we realized that our first duty was to minister to the needs of our patrons, and that in the case of a very small percentage of unfavorable replies we should consider our plans.

We then sent a similar notice to each customer whose name appeared upon our books and simultaneously placed large advertisements in the local papers, setting forth our reason for making the movement, and asking for an expression of approval or disapproval. The returns far exceeded our expectation. The personal communications were responded to almost without exception, and we received literally thousands of signed coupons cut from the papers. In addition to this, we received coupons bearing long lists of signatures of the employees of some of the larger establishments, and not a few expressions of approval from labor organizations. There were but two unfavorable answers among the thousands of replies received.

With the substantial endorsement we entered upon our plan with enthusiasm, and at this time, after nearly three years of trial, we repeat what we have often said before, that there has been no single action in connection with the conduct of our business that has afforded so much satisfaction as this one of Sunday closing. I urge upon the druggists of the country its favorable consideration. If we are to make our calling attractive to the better class of men we must make it a business rather than a grind.

A letter sent to Mr. Leet by the writer, a few months after the publication of his paper, thanking him for the service he had rendered the cause, brought this reply:

> The paper was written hastily and is not as strong as it might have been made.

About a year later, in August of last year, Mr. Leet stated regarding the Sunday closing situation:

> In our own case we have for the past several months kept our doors closed entirely except to emergencies on Sunday. All of the stores in San Francisco and Oakland are now closing between the hours of one and six P.M. I believe if the Sunday closing is practiced with due reference to the requirements of the community that it will grow in favor and that it will become a permanent condition, and I believe that it will have a great deal to do in the long run in getting better men into the business, and making better men out of the men who are already in it;

and in a letter written a few weeks ago regarding the Sunday closing situation in these cities, he states:

We think that there is no desire to go back to the "all day" open stores.

Coming nearer home for some examples of the successful operation of the Sunday closing plan, we refer to the store of Mr. Charles Holzhauer, located on a busy corner in the City of Newark, New Jersey. Mr. Holzhauer has had fifty years' experience in that city and his store has never been open on Sunday except during certain hours; at present this store is open on Sunday between the hours of 10.00 A.M. and 12.30 P.M. and from 7.00 to 9.00 o'clock P.M.; the business during this period being limited strictly to drug work, with one man in charge; at the last annual meeting of the "N.J.P.A.," in speaking of his experience in "Sunday closing," Mr. Holzhauer said:

I don't believe I have lost one cent by doing this; I have as strong a competition as any man in New Jersey, and it is getting stronger every day, and *if I should live to be fifty years longer in the business I am determined never to be open on Sunday.* I remember well a very prominent member of this organization, and one whom I thought a great deal of, talked to me many times about this. He wished he could do as I did on that question. I asked him, "Why don't you?" He said he could not close on Sunday, as that was his best day, and he could not afford to give up the returns of the business on Sunday. I answered him that "My firm belief is, you will prosper more by closing your store on Sunday than by keeping open." When that man died there was not money enough to pay his debts. So far as the necessity of the store being open on Sunday, there is no more reason why a drug store should be open all day than it should be open all night.

Coming directly home for another example of Sunday closing, we are pleased to refer to the store of Mr. Henry C. Blair, at 8th and Walnut Streets, this city; this store is open on Sunday from 9.00 A.M. to 12.30 M. and from 6.00 to 9.00 P.M., except the period from July 1st to September 15th, when the service is further shortened and the Sunday hours are then from 9.00 to 11.00 A.M. and from 7.00 to 8.00 P.M.

In an interesting letter Mr. Blair writes as follows:

On Sundays I positively do not sell soda water, cigars, candy nor postage stamps. My instructions to clerks are "sell only medicines and necessities." This custom in my store has been carried out since my grandfather purchased the store. My prescription work is just the same as it always has been. I do much more business on Mondays and Saturdays than any other days of the week, showing that my customers realize that they must purchase on other than Sunday. I believe I could do more business by keeping open on Sunday, but eventually I would lose, because a man

who does not have at least one day a week for rest and recreation is not fit to do his best in work.

The writer believes that this Sunday closing practice has played no small part in contributing to the success and enviable reputation which the Blair store has always enjoyed.

In the resolutions adopted by the "Pennsylvania Pharmaceutical Association" last year occurs this clause:

> We believe that the public, if properly advised of the facts, will be entirely willing to adjust its habits to shorter hours of work for the druggist, just as it has adjusted itself to shorter hours in other lines of work.

The experience of Mr. Leet's firm, previously related, proves conclusively the correctness of this assertion.

BROTHER PHARMACISTS: Sunday closing can be successfully adopted and the public are ready for it; shall we not proceed at once to put it in effect?

SHORTER HOURS FOR PHARMACISTS.

BY CLEMENT B. LOWE, M.D.

Some one has said that God never did a kinder thing for the human race, after turning them out of the Garden of Eden, than to ordain that man should earn his bread by the sweat of his brow, "for idleness is the root of all evil," according to another authority. We all know what follies the idle rich are often guilty of.

We all are probably willing to concede that work is a blessing that makes the hours of the day fly apace, and yet one can have too much of even a good thing, "all work and no play, makes Jack a dull boy." The result of long hours of continuous labor, day after day, especially if carried on indoors, may be damaging to health, possibly lowering the vitality so as to make one susceptible to disease.

One of the trustees of the College said he received some excellent advice when he first insured his life, from the medical examiner: he was told that the drug business was not conducive to health and was advised to take as much out-door exercise as possible; he attributes his present excellent health to his opportunities for following the advice. If continuous labor does not affect our health, it may affect our spirits, sapping our enthusiasm and producing a kind of mental lethargy. One apothecary in speaking of his too long

hours of continuous labor, said that when through with the labor of the long day, he was too tired to plan for the improvement of his business, or to study up new things. It might have been quoted to him Arnauld's saying: "Rest! Rest! Shall you not have all eternity to rest in."

The social economist tells us, that the ideal division of the day is into three parts: eight hours for work, eight hours for rest, eight hours for recreation, and many mechanics and office men, especially those working for municipalities, have attained to this ideal division. It is difficult at times to draw the line between work, rest and recreation, change of labor is recreation to some, men whose work is of a sedentary character that confines them closely to their desks, frequently enjoy working in a garden, or cultivating flowers. Locke says "pleasant tasks depend not on the things themselves, but on their agreeableness to this or that palate." The writer has frequently seen the hard-worked pharmacist derive both pleasure and profit from an amateur game of base-ball.

Another side of the question which we do not often hear brought out is, that the long hours of the drug business deter many young men from entering the business who would have been an ornament to it. It is safe to say that many of the young men who in the past have taken up pharmacy, have not done so deliberately, but have rather drifted into the business; this drifting under the new educational requirements will greatly lessen, a young man will hesitate about taking up a business that demands nearly all of his waking hours, he will say to himself, *cui bono* (what good), he will be tempted to take up some other occupation that will pay him equally well for shorter hours of service; this will lessen either the quantity or quality of clerks.

The question will arise, can the pharmacist supply the wants of his customers equally well in shorter time? I emphatically say yes. The retail grocers have tried this out successfully; a few years ago every grocery kept open until 9 or 10 P.M., now on five days of the week they close promptly at 6 P.M. Have you heard of anyone starving to death, or even going hungry by this action?

The writer well remembers a grocery in the country town in which he resided when a boy. It was kept open every week day evening until 10 P.M. After the supper hour a number of the old cronies residing in the neighborhood used to assemble in the grocery. Seated in the split-bottom chairs surrounding the clay cylinder stove,

they would smoke their pipes, or chew their tobacco, from time to time squirting a stream of liquid juice with considerable dexterity into the sand-box in which the stove was placed. The politics of the day were discussed, the battles of the Civil War were fought over again. They marched up and down the peninsula with McClellan, they besieged Vicksburg with Grant, and were victorious with Meade at Gettysburg. The Emancipation Proclamation and other great questions of the day were discussed with much heated argument, feeling sometimes being as hot as the stove. Once in awhile a customer or two would stray in, but excepting Saturday night the business done was small, the most of the time the grocer was lolling over the counter, taking more or less interest in the debate, in which he occasionally joined. About 9 P.M., or shortly after this, the debating club would break up. One of its members would say, "I want a pound of coffee," another, "my wife told me to bring her home some tea," and others would have various wants, so that until the closing hour of 10 P.M. there was quite a bustle in the store. The grocer had supplied room, fuel and light for these free American citizens, and had been kept from his own family, because he was not at that time the manager of his own business, he has grown wiser since.

Perhaps you will say that a grocery is not in the same class with a pharmacy; the first is a convenience, the second a necessity, but there is no more reason why the drug store should be kept open to supply remedies for every ache and ailment that flesh is heir to, than for a grocery to keep open to supply food every time a man is hungry. People in the country, miles away from a drug store, are usually wise enough to keep a number of remedies in the house, and every physician carries a few remedies for emergencies. Another reason why prescription business sometimes runs late in the day, is, that calling the physician is often put off until late in the day, or evening, with the view of saving the physician's fee. One physician endeavors to prevent this by charging a double fee for all calls sent in after 6 P.M. If he is called previous to that time and cannot get there until after 6 P.M. no extra charge is made. I have said previously, that the question may be asked, Can the pharmacist supply his customers' wants in a shorter time than at present? I think that he can; it is rarely that the whole force of the store is continuously employed. It would be better to concentrate the business into shorter hours than to have it drag out its slow length. To concentrate busi-

ness might require more systematic methods of doing business, as far as the counter or prescription business would allow; in many stores the business is just allowed to drift.

What are the hindrances to shorter hours? Apathy is one. "There's no use in trying," says one, "nothing can be done." Another says, "I will close earlier if my neighbor will," and he will, if his neighbor will, and so we go until we bump up against a store that keeps open all night, "and the fat is in the fire."

When an agreement has been made, it is not always kept. I have known of a druggist walking out into the street to see if his neighbor's window-lights were still burning. Wm. E. Krewson, for many years the secretary of the Alumni Association of the P.C.P., used to say that where an agreement for closing had been made, all trouble might be avoided, if when required to keep open beyond the specified time, the window-lights should be put out. Every pharmaceutical student who is trying to work his way through college knows how difficult it is to keep up with his classes, if he works from 7 A.M. to 11 P.M., as some do; all time for study has to be taken from his greatly needed rest.

I have no doubt that every clerk present will agree with me that shorter hours are not only desirable, but are in fact a necessity, and that any proprietor who will not do his best to assist in this much needed reform is a mean "old codger," as I have heard him called. But will they keep this same opinion when they get into business for themselves and are so anxious for success; in fact, need every dollar that can possibly be taken in? Will they not be tempted to extend the time so as to secure a little additional revenue? I think this is one of the evils resulting from the starting of a new store where one is scarcely needed, especially is this the case where the new store has been started by the clerk of a former employer. Sometimes a store is bought out by a new man who will not be bound by the rules previously tacitly agreed upon, and keeps open to a later hour, and thereby forces the others to do the same. The writer knows of a case of exactly this kind, in a suburb of the city where the closing time agreed upon had been 9 P.M., an hour at which most of the good people of that section in the winter were in bed, the newcomer, an ambitious young man, would not be bound by the previous agreement but kept open until 10 P.M., and the others of course followed suit.

I think the cause of "shorter hours" is making headway. Much attention is being given to this subject in different parts of the

country, and agreements are being made whereby this reform is being carried into effect. One of the trustees of the College in whose store quite a business is done on Sunday, told me a few days ago that he was making arrangements by which those who are on duty on Sunday will have an extra afternoon on Monday. Shorter hours should be comparatively easy of achievement in many country towns. I would not wait until every pharmacist had agreed to the measure, for some people are so naturally obstinate that it seems impossible for them to agree to anything that anyone else advocates. If they propose anything themselves it is all right. In a country town in winter the closing time should not be later than 8 P.M. The most of the druggists could get together and announce the new departure in the papers and on prominent hand-bills, giving their reasons for their action, namely, the duty which they owe to their families, to their health, to their social natures, to their intellectual natures, to their spiritual natures, and that by this new departure they expected to be in a better mental and physical condition for their work and consequently would be able to give their customers better service. Such a course of action would probably enlist the sympathy and co-operation of most of the citizens; the druggist who refused to join in the new departure would find himself out of touch with most of the people, perhaps despised by many. I have said nothing about shorter hours on the Sabbath in this paper, not because I do not believe in them, but because I did not wish to trespass upon the subject assigned to my colleague of the afternoon, but perhaps a few words may not be amiss. I am satisfied that the chief obstacle to shorter hours on the Sabbath is the "spirit of gain"; in fact, I have been told by several, that if it were not for the Sabbath business it would not pay to run their stores. The modern and beautiful soda-water fountains have so much money locked up in them that no opportunity must be neglected to make them profitable, and the patronage of this day is considered by some as being worth as much as any other three days of the week. If the practice of Jacob H. Redsecker, of Lebanon, of most honored memory, were followed, the business on this day of the week would be confined to actual necessities. It was the custom of Mr. Redsecker and his partner, Mr. George Ross, to devote all of the profits of this day's business to missions.

In conclusion I hope that I have said something this afternoon that will set you thinking. I thank you for your kind attention.

PROGRESS IN PHARMACY.

A Quarterly Review of some of the more interesting Literature relating to Pharmacy and Materia Medica.

By M. I. Wilbert, Washington, D. C.

Pharmaceutical history is accumulating apace just at the present time, so much so that it is really difficult to keep in touch with or even to recognize all of the various activities that are destined to affect the practice of pharmacy quite profoundly in the very near future.

This fact is readily shown by recent developments in connection with the work of the Division of Pharmaceutical Chemistry of the American Chemical Society. The winter meeting of this division was devoted largely to the discussion of pharmacopœial problems and a number of resolutions bearing on the nature and content of the Pharmacopœia were adopted and referred to the Committee of Revision. (*J. Ind. & Eng. Chem.* 1912, v. 4, pp. 150–151.)

These resolutions relate to the form of stating solubility data, the retention of the form and style of spelling the names now in the U.S.P., the method of stating the purity rubric and the inclusion of accurate tables giving the refractive indices of mixtures of alcohol and water.

The Journal of the American Pharmaceutical Association.—Number 1 of Volume 1 of the *Journal of the American Pharmaceutical Association* is dated January, 1912, and while it marks the passing of the well established and generally appreciated "Proceedings" and the more recent "Bulletin," it also marks the opening of a new Era of usefulness and development on the part of the American Pharmaceutical Association. Taking the first number as a fair suggestion of the scope and nature of the Journal, American pharmacy is to be congratulated on the acquirement of an additional periodical of high standing and exceptional ideals. While the prime object of the Journal is to furnish a more direct and speedy means of communication between the Association and its members, pharmacy at large cannot help but be benefited by the work that is reflected in the pages of this Journal.

The comments appearing in current medical and pharmaceutical journals have been uniformly commendatory though there appears to be a general feeling of regret that the well edited, useful and in

many ways unique volume of "Proceedings" will no longer be issued.

The *Pharmaceutical Journal* (London 1912, v. 88, p. 87), in commenting on the *Journal of the American Pharmaceutical Association,* expresses the opinion that the passing of the familiar Annual Proceedings will be a cause of keen regret.

TRANSACTIONS OF THE SECTION ON PHARMACOLOGY AND THERAPEUTICS of the American Medical Association at the Sixty-second annual session held at Los Angeles, Cal., June 27 to 30, 1911, have been reprinted in the form of a large 8vo volume of 350 pages. Many of the papers included in this volume are of direct interest to pharmacists and the volume as a whole represents a reflection of the activities of medical practitioners to arouse greater interest in scientific materia medica and the elimination of fakes, frauds and inert materials from the drug armamentarium of present day medical practitioners. Pharmacists who are really interested in the progress of the sciences related to pharmacy should not fail to include this reprint among their books of reference. The book is published by the American Medical Association and is sold at the moderate price of one dollar, postpaid.

THE FOURTH REPORT OF THE WELLCOME TROPICAL RESEARCH LABORATORIES at the Gordon Memorial College Khartoum, Published for the Department of Education, Sudan Government Khartoum, is now being distributed. The present report compares favorably in appearance and variety of content with previous reports from the same Laboratories and it is indeed difficult to determine which of the several excellent features are most to be commended. The report appears in two volumes: volume A.—Medical, and volume B.—General Science. The latter volume contains several communications that are of direct interest to pharmacists. These papers include a test for hashish and the reports of experiments on gum production in Kordofan. The two volumes are exceptionally well illustrated and this with the interesting nature of the contained material should make them a welcome addition to any medico pharmaceutical library.

AUSTRALASIAN PHARMACEUTICAL FORMULARY, 1911.—The Australasian Pharmaceutical Formulary has now been published. It is a small pocket book of a hundred pages, and is sold at one shilling. The first edition was published in 1902, and since that time the conditions of pharmacy in Australasia have altered considerably.

The main idea of the work is that physicians may have at their disposal a series of preparations correct in their constitution, both physically and chemically; the subsidiary object is to place in the hands of the pharmacist a set of workable formulae, with full directions as to their manipulation, and only such preparations as can be made in any reasonably well equipped pharmacy are included. Each process has been thoroughly tested, we are assured, and, while a number of the formulae are the result of original experiments, others have been drawn, with or without modification, from various sources, but chiefly from the B. P. Codex. There is a full list of trade names and synonyms provided; in fact, this constitutes a greater portion of the booklet, occupying as it does sixty-four of the hundred pages. The nomenclature adopted is that of the British Pharmacopœia.—*Pharm. J.* (Lond.), 1911, v. 87, p. 776.

WILEY INVESTIGATION.—An editorial (*J. Am. M. Ass.*, 1912, v. 58, p. 347) calls attention to the report of the Committee on Expenditures of the Department of Agriculture, popularly known as the Moss Committee. This Committee after making an extensive investigation "from the evidence adduced that the accused officials were actuated throughout by a desire to procure from the Bureau of Chemistry an efficient assistant in the person of Dr. H. H. Rusby under terms and conditions which those officials believed to be in entire accord with the law, regulations and practice of the Department of Agriculture."

BUREAU OF CHEMISTRY RULING.—An editorial (*Western Druggist*, 1911, v. 33, p. 622) points out that the Board of Food and Drug Inspection of the Department of Agriculture has decided that, hereafter, before publication of its decisions, those concerned will be given an opportunity to be heard in defense of their product.

SODIUM BENZOATE.—A number of articles discussing the "Expert Opinion of the Royal Scientific Deputation for Medical Affairs Regarding the Use of Benzoic Acid and Its Salts for the Preservation of Food" have appeared during the past months in pharmaceutical, medical and scientific journals. It appears that the original translation of the report, as given out to pharmaceutical and medical journals was either poorly done or purposely garbled. A correction, in the original German, by the members of the Royal Scientific Deputation, appears in the *Journal of the American Medical Association* (Jan. 20, 1912, v. 58, p. 199) and should serve to end the unnecessary and useless controversy.

INTERNATIONAL OPIUM CONFERENCE.—The International Opium

Conference was opened at the Hague on December 1 by Dr. Van Swinderen, Dutch Minister of Foreign Affairs. Twelve nations were represented at the Conference, comprising Great Britain, Germany, France, Holland, Italy, Russia, Protugal, China, Japan, Persia, Siam and the United States, all the powers being represented on the Shanghai Commission of February, 1909. Turkey was especially invited to take part, but declined. The Right Rev. C. H. Brent, Bishop of the Philippines, who presided over the Shanghai Congress, was elected President, and in accepting the honor, referred to the great problem involved in the opium question. He believes the Shanghai Conference pointed the way for the legislation to be adopted, and he hopes that the legislative Acts which should result from the work of the Conference would have the opinion of the whole world behind it.—*Chem. & Drug.*, 1911, v. 79, p. 860.

The International Conference at The Hague regarding the preparation and sale of opium, morphine, cocaine and related narcotics has finally adjourned and the protocol signed by the representatives of the several governments represented is destined to have a far reaching influence on the practice of pharmacy throughout the world. The limitations that will necessarily be imposed on the manufacture and sale of products ordinarily classed as narcotic drugs will be far reaching and to be at all effective must be radical.

An editorial (*Chemist and Druggist*, 1912, v. 80, p. 190) points out that the contracting powers have agreed among themselves to control the production and distribution of raw, prepared and medicinal opium, morphine, cocaine and their derivatives. These proposals are fully described in the 25 articles of the Convention. Articles 9 to 14 Chapter 3, deal more specially with morphine, cocaine and related products and are of paramount interest to the drug trade as they limit the manufacture and sale of these drugs to medical and strictly legitimate uses. With this object in view the several contracting governments have undertaken to control or cause to be controlled all those who manufacture, import, sell, distribute and export morphine, cocaine and their respective salts.

A practical adherence to the text of the convention will necessitate the enactment of legislation in this country that will, eventually at least, revolutionize the practice of pharmacy.

The Proposed Ruling of the Board of Food and Drug Inspection to regulate the importation and sale of opium, morphine, cocaine, coca, their derivatives and preparations, is reprinted in the

Journal of the American Pharmaceutical Association (1912, v. 1, pp. 77–81) and commented on by Mr. Beringer.

An editorial (*Drug Topics,* 1912, v. 27, p. 17), in commenting on the proposed action says: "The Board of Food and Drug Inspection has adopted an unusual policy in sending out a 'tentative F.I.D.' relative to the importation and sale of morphine and other habit forming drugs. We presume the 'tentative' method has been adopted because even the Board itself must recognize the illegality of its proposed decision, which is a typical instance of bureaucratic legislation. We are in sympathy with the Board's ideas in wanting further restriction upon the sale of narcotic drugs, and expect to see further checks put upon their sale; but don't let us forget that this is a Government by law."

METHYL ALCOHOL.—The Berlin Correspondent (*J. Am. M. Ass.,* 1912, v. 58, p. 290) calls attention to a large number of cases of poisoning due to methyl alcohol sold in the form of cheap whisky. Up to December 30, 1911, no less than 161 persons had been taken sick in and immediately surrounding the Berlin Municipal Lodging House, and of this number 71 had died. It was at first supposed that the illness was due to decomposed smoked meat but it was later learned that in most cases at least there had been an intoxication with wood alcohol which had been sold in the saloons of the neighborhood.

An unsigned article calls attention to a number of fatal cases of poisoning, from the ingestion of methyl alcohol, and reviews the literature relating to the toxicity of methyl alcohol.—*Pharm. Zentralbl.,* 1912, v. 53, pp. 46–47.

Güth, Heinrich, reviews the several tests that have been suggested from time to time for the detection and estimation of methyl alcohol in spirituous liquors, tinctures and perfumes.—*Pharm. Zentrlh.* 1912, v. 53, pp. 57–59.

The Vienna Correspondent reports that as a consequence of the numerous fatal casualties in the Municipal Asyl in Berlin where more than 60 lives were lost by the use of adulterated alcohol, the Austrian board of health has just issued an ordinance in which the use of methylated spirit is limited to certain industrial purposes.—*J. Am. M. Ass.,* 1912, v. 58, p. 423.

BRITISH PHARMACOPŒIA.—The Pharmacopœia Committee of the General Medical Council reports that the editors of the new issue of the Pharmacopœia are now engaged in classifying the materials

relating to the revision of the text which have accumulated in the committee's hands. The committee have to acknowledge the courtesy of the Council of the Pharmaceutical Society of Great Britain, who have been good enough to make arrangements which have facilitated Professor Greenish's acceptance of this appointment. The editors have submitted for the approval of the committee an outline of the steps they proposed to take for the preparation of a first draft of the revised text.—*Chem. & Drug.*, 1911, v. 79, p. 86.

Post-Graduate Instruction.—An editorial (*Pharm. J.* Lond. 1911, v. 87, p. 777) points out that the Council of Pharmacy has sanctioned arrangements for a course of five lectures on "The Terpenes and Essential Oils," to be delivered at 17 Bloomsbury Square, London, in the Spring of 1912. These will partake of the nature of post-graduate lectures, such as there has at times been a demand for among members of the Society who wished to continue their scientific studies beyond the requirements of the Major Examination and under academic conditions.

Experimental Therapeutics.—Torald Sollmann points out that the treatment of every patient is more or less of an experiment and that much of the criticism that has been published of laboratory experimenters is not well founded. He concludes that clinical experimentation could well afford to follow the canons of other scientific experimentation, granting of course that it is to be made useful from a practical or scientific point of view.—*J. Am. M. Ass.*, 1912, v. 58, pp. 242–244.

Doses.—The dose of a drug should be based on the age, weight and individuality of the patient and the necessity for a strong action of the drug. The frequency of the dose is determined by the results obtained, by the length of time it takes the drug to be eliminated or cease its action, and the possibility of its causing a cumulative action. Age and weight are the most important factors in determining the dose to be given.—*J. Am. M. Ass.* 1911, v. 57, p. 1368.

Salicylic Acid.—An editorial (*J. Am. M. Ass.* 1912, v. 58, p. 116) calls attention to a comprehensive investigation of the relative toxicity of natural and synthetic salicylic acid reported by J. A. Waddell. This report is the first of a series on the pharmacology and therapeutics of salicylic acid and establishes the fact that so far as toxicity to the animals experimented on is concerned there is no demonstrable difference between natural and synthetic salicylic acid.

Borax.—Johnson, W., calls attention to a sample of "ordinary

double refined borax," which contained 99.5 per cent. of real borax and contained as much as 200 parts of arsenic per million. He thinks that borax containing such a large proportion of arsenic is unfitted for use in connection with pharmaceutical preparations and should not be sold for medicinal use.—*Pharm. J.* (Lond.), 1911, v. 87, p. 871.

CALABAR BEAN.—Salway, Arthur H., as the result of a chemical examination of calabar bean, reports the following constituents: alkaloids; physostigmine, physovenine, eseramine; dihydric alcohols; trifolianol, calabarol; glycerides of palmitic, stearic, behenic, oleic, and linolic acids.—*Chem. & Drug.* 1911, v. 79, p. 790.

MALE FERN.—Parry, Ernest J., reports an examination of commercial extract of male fern and concludes that a greater part of the male fern extract of commerce is undoubtedly adulterated with from 30 to 60 per cent. of castor oil.—*Pharm. J.* (Lond.), 1911, v. 87, p. 778.

PAREGORIC.—Sargent, F. Pilkington, outlines the evolution of camphorated tincture of opium. He asserts that paregoric was introduced into medicine by Le Mort, professor of chemistry at Leyden University, early in the eighteenth century. It became very popular, and was introduced into the London Pharmacopœia of 1721 as Elixir Asthmaticum. It appears that camphor was first added to the formula included in the London Pharmacopœia of 1809.—*Pharm. J.* (Lond.), 1911, v. 87, p. 716.

PROPAESIN.—Propyl aminobenzoate is prepared by the esterification of paraminobenzoic acid with propyl alcohol. It occurs as a fine white powder, odorless and nearly tasteless. It is only slightly soluble in water and is not readily wetted by this solvent. When placed on the tongue it produces numbness. It is used as a local anesthetic and analgesic. Internally it is given in doses of from 0.25 to 0.5 Gm.—*J. Am. M. Ass.* 1912, v. 58, p. 34.

SALVARSAN.—Arsenophenol-amin hydrochloride, Arsenobenzol. "606," is now described in New and Non-official Remedies as being marketed in compliance with the rules of the Council on Pharmacy and Chemistry. The description calls attention to the precautions that are to be observed in dispensing this remedy and should go far toward assisting in establishing the limitations for this now well-known remedy.—*J. Am. M. Ass.*, 1912, v. 58, p. 191.

SCARLT RED.—Rae, James, in the *Lancet* reports his experiences with the use of scarlet red and asserts that in upwards of 80 cases this drug has seemed to produce marked improvement

within 24 hours. He has noticed that after a time a gritty sediment forms in preparations which seems to show that it is preferable to make them up frequently in small quantities at a time.—*Chem. & Drug.*, 1911, v. 79, p. 959.

SULPHUR.—The *Journal of Industrial and Engineering Chemistry* (1912, v. 4, pp. 131–147) in a report of the proceedings in connection with the conference of the Perkin Medal on Mr. Herman Frasch, presents a comprehensive review of the development of the Louisiana sulphur industry and a no less interesting account of the several accomplishments of the inventive genius who devised the plans for overcoming the difficulties involved and succeeded in revolutionizing the sulphur trade of the world.

VERONAL.—A news note (*Pharm. J.* (Lond.), 1911, v. 87, p. 725) reports a death of a woman, age 38, from an overdose of veronal. An additional case of veronal poisoning (*Ibid.* p. 765) is that of a physician, age 39.

An editorial (*J. Am. M. Ass.*, 1912, v. 58, p. 196) calls attention to several recent articles on the pharmacology of veronal and the causes for the rather numerous cases of fatal poisoning by this drug. While the response of veronal in permissible amounts is ordinarily quite satisfactory the slow excretion of the drug is an element of danger in a repetition of the dose within too brief intervals.

BOOK REVIEWS.

QUANTITATIVE CHEMICAL ANALYSIS. Adapted for use in the Laboratories of Colleges and Schools. By Frank Clowes, D.Sc., and J. Bernard Coleman, A.R.C.Sc. Ninth edition. Philadelphia: P. Blakiston's Sons & Co. 1911. $3.50 net.

The subject matter in this work has been subdivided into eight principal parts. Part I contains an excellent treatment of the various preliminary and general operations which are employed in quantitative analysis. Parts II and III are respectively devoted to gravimetric and volumetric analysis. Part IV contains descriptions of the more complex quantitative estimations. Part V describes the processes of analysis of organic substances and explains the methods employed in the determination of molecular weights. Part VI is devoted to gas analysis. Part VII contains certain typical results of analyses. Part VIII contains descriptions of the processes employed in the preparation of distilled water and various gases, and a discussion on the use of compressed gases.

The book contains 128 illustrations, and has been carefully prepared. It is intended to supplement rather than replace oral instruction and demonstration by the instructor. The work is not only well adapted for laboratory instruction but will be found useful to the analyst as well. It contains a large amount of information on the analysis of inorganic and organic substances, and appears to the writer to be one of the best books on the subject of quantitative analysis. H. K.

FOURTH REPORT OF THE WELLCOME TROPICAL RESEARCH LABORATORIES AT THE GORDON MEMORIAL COLLEGE, Khartoum. Volume A, Medical. Andrew Balfour, M.D., B.Sc., etc., Director. Published for Department of Education, Sudan Government, Khartoum, by Ballière, Tindall and Cox, 8 Henrietta Street, Covent Garden, London, 1911. Depots for North America: United States—Toga Publishing Co., 35 West Thirty-third Street, New York City, Dominion of Canada—Toga Publishing Co., 101 Coristine Building, St. Nicholas Street, Montreal. Vol. A., Medical. $5 net.

It will be recalled by our readers that the Functions of the Wellcome Tropical Research Laboratories, Gordon Memorial College, Khartoum, are: (*a*) To promote technical education. (*b*) To promote the study, bacteriologically and physiologically, of tropical disorders, especially the infective diseases of both man and beast peculiar to the Sudan, and to render assistance to the officers of health, and to the clinics of the civil and military hospitals. (*c*) To aid experimental investigations in poisoning cases by the detection and experimental determination of toxic agents, particularly the obscure potent substances employed by the natives. (*d*) To carry out such chemical and bacteriological tests in connection with water, foodstuffs, and health and sanitary matters as may be found desirable. (*e*) To promote the study of disorders and pests which attack food and textile producing and other economic plant life in the Sudan. (*f*) To undertake the testing and assaying of agricultural, mineral and other substances of practical interest in the industrial development of the Sudan.

The previous reports of the laboratories were published in 1904, 1906 and 1908. Their perusal is necessary to a complete understanding of the research work undertaken in the Sudan, during recent years, into varied and deeply interesting problems upon which much scientific labor has been expended. They contain the facts, observations and discoveries brought to light during the last few

years. Unlike the commentaries and digests which are so familiar a feature of the scientific press, these volumes contain the actual record, at first hand, of new contributions to the solution of problems of deep and world-wide import.

Their value is further enhanced by the superb manner in which the knowledge, so laboriously gained, has been presented and illustrated. The expansion of the work of the laboratories and the amount of new material collected during the last few years have rendered it impossible to issue the fourth report in one volume, and the subject matter has, therefore, been divided into two parts. The first part, Volume A, deals with the medical aspects of the work of research. Volume B, which relates to general science, is now in the press, and will be issued shortly. Volume A presents the results of the bacteriological examinations carried out at the laboratories. Pathological and other specimens from a wide area, and illustrative of many forms of endemic disease, have been the subjects of investigation. Important papers have also been contributed on the work of the Sleeping Sickness and Kala-azar Commissions. The fallacies and puzzles met with in the course of blood examination in the Tropics form the subject of an interesting and well-illustrated article. An extended research on fowl spirochætosis has demonstrated the important rôle played by the "infected granule" in this disease. Other papers include records of work on trypanosomiasis, human spirochætosis, kala-azar, forms of cutaneous leishmaniasis, veldt sore, diphtheria, human botryomycosis, veterinary diseases, etc. The interesting notes contained in the previous reports on sanitation in the Sudan are continued.

The price fixed for the reports is as moderate as is consistent with the great cost of production, and any profit made will be devoted by the Sudan Department of Education to a special fund for future publications of the laboratories.

The volume which has just been received, contains 404 pages, including 34 pages of index; 14 colored plates; 44 reproductions of black-and-white drawings; 104 reproductions of photographs and wash drawings; and 12 maps and plans. The following is a summary of the contents:

Introduction—Changes and Plans—The Future of Scientific Work in the Sudan—Sleeping Sickness in the Anglo-Egyptian Sudan—Investigation of Natural Conditions in the Bahr-El-Ghazal—Animal Trypanosomes—*Trypanosoma brucei*—Human Spirochætosis—The Spirochæte of Egyptian Relapsing Fever—Spirochæ-

tosis of Sudanese Fowls—Method of Obtaining Blood Aseptically for the Culture of Hæmatozoa in the Tropics—Fallacies and Puzzles of. Blood Examination—Kala-azar in the Kassala and Blue Nile Districts and Eastern Sudan—General and Pathological Reports of the Kala-azar Commission—The Alkalinity of the Blood Serum in Kala-azar—*Herpetomonas lygœi*—Descriptions of Cases of Kala-azar, Non-Ulcerating Sore, "Oriental Sore," Parasitic Granuloma, Veldt Sore, *Ulcus tropicum,* Leucoderma—Fevers in the Sudan—Pyrexia—Diphtheria in the Tropics—Some Aspects of Tropical Sanitation—Sanitary Notes—The Water-supply of Towns in the Tropics—Lactose-fermenting Bacilli in Surface Water, etc.—Filtering Properties of the Zeer—Human Botryomycosis—Veterinary Notes—Miscellaneous Notes on Hæmatozoa, Howell-Horrocks Bodies in the Human Blood, Mycetoma, Leprosy, Dysentery, Peculiar Bodies in the Intestinal Lymphoid Follicles of an Egyptian—Routine Work—Index.

Scientists who are familiar with the preceding reports, containing as they do most painstaking and valuable work on tropical diseases and tropical sanitation, will find in the fourth report of the Wellcome Tropical Research Laboratories the same degree of excellence and an equal amount of information. It is refreshing indeed to learn that the various problems resulting from unfavorable conditions in the Sudan are being so assiduously studied with the view of the control of the various diseases and the development of a country of inestimable wealth and with the promise of a great future.

One can have but the highest admiration for the scientists who have gone into this region to study the nature and origin of the diseases, and when one considers how dependent the advance of those nations who have undertaken the civilization and development of the resources of this part of the world, is on the progress in the study of the diseases peculiar to it, one realizes anew the great practical benefits to mankind that come from scientific research. It will be recalled that when Ex-President Roosevelt planned his trip into the heart of Africa it was feared by many who were familiar with the unhealthfulness of the country, with its pestilential areas on every hand, that he might not return to civilization alive let alone a well man. Fortunately he returned to the United States well and with magnificent collections intended to enrich our knowledge of the fauna of a wide section of the African continent, which contribution to science we doubtless owe in part at least to advance in another branch of science. Incidentally it may be mentioned that when

Colonel Roosevelt stopped at Khartoum he visited the Wellcome Tropical Research Laboratories.

We in the United States, and particularly members of the Philadelphia College of Pharmacy, must rejoice that a graduate of this college is devoting much of his means in so worthy an undertaking.

H. K.

ARBEITEN AUS DEM PHARMAZEUTISCHEN INSTITUT DER UNIVERSITÄT BERLIN. Herausgegeben von Dr. H. Thoms, Achter Band, Mit 1 Textabbzildung, Urban & Schwarzenberg, Berlin und Wein, 1911.

Volume 8 of the annual reports from the Pharmaceutical Institute of the University of Berlin records the work done in the several laboratories during the year 1910. The book in keeping with the previous volumes is a large 8vo of 280 pages and contains 46 separate articles and reports. As in previous volumes the work done in the several divisions of the Institute is reported in collected form for ready reference. The division for the examination of medicines, specialties and secret remedies, presents the usual review of the more important new remedies marketed during the year 1910 and reports on the examination of a number of secret remedies and pharmaceutical specialties. The report of the work of this division takes up 67 pages of the book.

The report of the work of the division of inorganic chemistry includes observations on the practical utilization of pure nitrogen, the determination of perboric acid and similar combinations and a study of the catalytic oxidation of Ammonia.

The report of the work done by the division of organic chemistry is devoted in part to reports on phytochemical observations, Dr. Thoms himself reporting his experiences in the cultivation of Japanese Mint in Germany.

The report of the division for the examination of foods and technical products of the colonies includes 12 papers on the chemistry of various products, mainly from the East African Colonies.

This volume like the seven preceding it, serves to foreshadow the work of pharmacy in the future, and for this reason alone the book should be found in the library of every pharmacist who is interested in the development of his calling, and it should certainly be found in the library of every pharmaceutical school and frequently referred to by teachers as an illustration of the work that can and should be done by students and future pharmacists.

M. I. WILBERT.

THE DECEMBER PHARMACEUTICAL MEETING.

This meeting was held on the 11th, at 3 P.M., in the materia medica lecture room, Mr. E. M. Boring presiding. The first paper was one on "Improvements in Pharmaceutical Apparatus," by J. Percy Remington, B.Sc., P.D. (son of Prof. J. P. Remington). After being introduced by Mr. Boring, Dr. Remington said he was sorry he could not bring his machine with him for making granulated effervescing salts, but as it weighed two tons and was forty feet in length, it was impossible. The working of the machine was, however, described in detail. He then exhibited and described a measuring faucet which he had devised, saying that in a large pharmaceutical establishment many thousand gallons might be lost each year through the evaporation of alcohol, during its handling, and the loss from washing measures, and dippers, etc. The ordinary method used for measuring fluid extracts has first been to draw a ten-gallon measure full, and dip from this to fill the smaller bottles, and the loss of alcohol by this method often causes the precipitation of some of the solid contents. There are a large number of bottling machines on the market, some of which use the bottles to be filled as the measure; this may answer where economy of time is desired, but not accuracy, and the liquid is not valuable. "Float measures" are often used, but the float valve may easily be choked and is difficult to clean. It was desirable to invent a measuring faucet, not too expensive, that could be left on the barrel. Such a faucet that will measure a pint or half a pint, can be built for a cost of less than $1.50. The "Remington" measuring faucet consists essentially of two glass cylinders and a four-way cock. This cock can be set so that a liquid can flow in and not flow out, or so that it can flow in one side, while the other side is emptying. The faucet is very accurate and there is no overflowing, not varying more than three minims in filling a four-ounce bottle. There is no chance for evaporation while using the apparatus. When in use the measured liquid runs into the bottle faster than into the measure. This faucet seems to fill all of the conditions of an ideal measuring faucet. Dr. Remington then spoke of the manufacture of granular effervescent salts. He said that their production from the standpoint of the manufacturer, at the present time, was unsatisfactory. The mass as now generally handled resulting from heating the materials, is pushed through coarse sieves by hand in order to form the granules. These are then put into a drying room over night, or dried by means of a vacuum pan. By this method of manufacture some of the salt is

overcooked; there is also much unevenness in the size of the granules, too much fine powder being present, contrasting unfavorably with the granules; to prevent this contrast has resulted in the whole powder being in a finer condition than is desirable. The making of the effervescent salts is really a baking process, the essentials of baking powder being present, the materials being heated and the product put into a drying closet, and then the dough-like material passes through number six tinned iron sieves. In the Remington machine the mixed powder is spread on long belts which pass over heated galvanized metal sheets, isolated by asbestos, the belt moving a foot in half a minute. After its being heated as mentioned, the dough is passed under polished rollers and divided into small cubes by cutters. At the first cutting, pieces the size of a lead pencil are cut off, each of these being afterwards cut into 108 pieces. The machine when in actual use will turn out a ton and a half of granular effervescent salt per day.

Prof. E. Fullerton Cook then spoke on "The Scope of Some of the Proposed Changes in the National Formulary IV." He gave briefly the origin of its predecessor, which was entitled "The New York and Brooklyn Formulary." It was issued in 1884, and afterwards presented to the American Pharmaceutical Association. The plan of the book was conceived by Dr. Chas. Rice, who became its first editor. The First Edition of the National Formulary was issued in 1888, the Second in 1896, the Third in 1906, the latter being made an official standard under the Pure Food and Drugs Act, to the surprise of many, as it had not been intended for a legal standard, there being no tests in the book. The Fourth Edition, it is believed, will be much improved, in style being quite similar to the U. S. Pharmacopœia.

The "Propaganda" movement has helped materially in popularizing the Formulary. The question then may be asked, How will the National Formulary differ from the U.S.P.? In the first place, it will contain formulas not considered of sufficient importance to go into the Pharmacopœia, such as Dobell's Solution, Stoke's Liniment, etc., and this is an acknowledged feature. Another class of preparations will consist of formulas from foreign pharmacopœias, such as Compound Oil of Hyoscyamus, Etherial Tincture of Ferric Chloride. There will also be preparations that were formerly official in the U.S.P., but out of the 117 now in the appendix of the book, only 63 are considered important enough to be retained. The appendix itself is to be abandoned, the preparations now in it that are to be

retained, going into the body of the book. There will be about 100 new preparations added. The New National Formulary will give descriptions and tests for all simple substances used in the formulas of the book which are not contained in the U.S.P. Only the metric system of weights and measures will be used.

Dr. C. B. Lowe then exhibited a capsule cleaner, the invention of J. Percy Remington, which had been in use in his store for some years and found of the greatest value in cleansing capsules; as it could be bought for $1, he rather wondered that so few druggists used it, as it was such a cleanly way of cleaning capsules, and was also a great time-saver. Professor Remington spoke of the blot on the National Formulary by its imitation formulas of some of the popular proprietary medicines. It was pointed out that the Pharmacopœia is also not without fault in this respect and that doubtless, with the awakened conscience on this question, all standard books will correct these defects in future editions. Mr. Warren H. Poley said that these proprietary preparations are only substitutes for old-fashioned preparations; he did not think the proprietary medicine manufacturers came with clean hands. On motion the meeting adjourned.

C. B. Lowe.

PHARMACEUTICAL BACTERIOLOGY.

Pharmaceutical Bacteriology.—Prof. Albert Schneider, of the California College of Pharmacy, is the author of an excellent book on "Pharmaceutical Bacteriology." It consists of nearly 250 pages and contains some 14 chapters dealing with the importance of bacteriology to pharmacists, the historical development of bacteriology, the general morphology and physiology of bacteria, range and distribution of bacteria, bacteriological technic, bacteria in the industries, immunity, bacterial activities and bacterial products, the manufacture and use of sera and vaccines, yeasts and moulds, protozoa in disease, disinfectants and disinfection, food preservatives, insecticides, sterilization and disinfection in the pharmacy, communicable diseases with suggestions on preventive medicine and a bacteriological and microscopical laboratory for the pharmacist.

In view of the professional requirements of the pharmacist and the practical importance of a knowledge of the principles of bacteriology by the pharmacist, this work by Professor Schneider is likely to be greatly appreciated by students in pharmacy as well as retail pharmacists. The publishers of the book are P. Blakiston's Son & Co., 1012 Walnut St., Philadelphia. Price $2.00 net.